FINAL

ENVIRONMENTAL ASSESSMENT: CONSTRUCTION OF CONSOLIDATED FUEL OVERHAUL AND REPAIR FACILITY

AT

TINKER AIR FORCE BASE, OKLAHOMA

United States Air Force
Air Force Materiel Command

Tinker Air Force Base, Oklahoma

October 2007

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FINDING OF NO PRACTICABLE ALTERNATIVE/ FINDING OF NO SIGNIFICANT IMPACT FOR THE CONSTRUCTION OF CONSOLIDATED FUEL OVERHAUL AND REPAIR FACILITY TINKER AIR FORCE BASE

Pursuant to the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500-1508) for implementing the procedural provisions of the National Environmental Policy Act (NEPA), Department of Defense (DoD) Directive 6050.1, and Air Force Regulation 32 CFR Part 989, the 72nd Civil Engineer Group, Environmental Management Division has prepared an Environmental Assessment (EA) that evaluates the potential environmental and socioeconomic impacts associated with the construction of a consolidated fuel overhaul and repair facility for Tinker Air Force Base (AFB). This EA is incorporated by reference into this finding.

Purpose and Need

Tinker AFB proposes to consolidate all shops of the 76th Maintenance Wing (76 MXW) utilized to overhaul, repair, and test aircraft fuel control accessories for supported weapons systems into one modern facility. The supported weapons systems include the A-10, B-1B, B-2B, B-52H, C-130, C-135, C-141, CH-53, E-3, F-14, F-15, F-16, TF-37, C-5, and C-17 aircraft. Currently, 76 MXW processes and tests fuel control accessories using obsolete equipment in two buildings (Building 3001 (B3001) and B3108) requiring major improvements and in one newer test facility, B3902. Current operations require items to be repaired or overhauled in an environmentally controlled area within B3001, then transported approximately 0.25 mile to B3108 and 0.9 mile to B3902 for final testing and acceptance. Items must be transferred between buildings until acceptance is attained, resulting in delays in meeting necessary production schedules and delays in return of aircraft to service. The proposed project is intended to improve the procedure, increase productivity, and enhance efficiency of processing fuel control accessories to provide the United States Air Force (USAF) with a reliable and responsive facility that operates at the required level of production. (EA Section 1.2, Page 1-1)

Description of Proposed Action

The proposed action entails the construction of a 140,000 square foot one-to-three story building on undeveloped property adjacent to B3902. This facility will replace the existing, obsolete test facility currently housed in both B3108 and portions of the B3001 overhaul facilities. The new facility will include Class 1, Division I, and Division II test areas for check and test of fuel components, a Class 300000 environmental control room for fuel control overhaul, cleaning areas, material control areas, and associated support and administrative areas. A parking area of up to 200 spaces would be constructed adjacent to the building to accommodate staff. The new building would be constructed to comply with the Unified Facilities Criteria (UFC) system issued by DoD in 2002, including the *DoD Minimum Antiterrorism Standards for Buildings*, in order to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for the DoD.
A 0.83 acre wetland currently exists at the project site near the property's northern boundary; implementation of the proposed action (i.e., development of the new building and parking lot) would require displacement of this existing wetland. Therefore, as part of the proposed action, a

wetland habitat of equal or greater value would be recreated at a replacement site at Reserve 3 South and Beaver Pond Marsh Filters in the southwestern portion of the base. The Proposed Action would fulfill the purpose and need of the project and also satisfy perimeter standoff requirements listed in the *DoD Minimum Antiterrorism Standards for Buildings*. However, the new building and parking lot would completely displace the existing wetland on the north side of the site. (EA Section 2.2, Page 2-1)

Alternatives

There are currently no viable development alternatives because the new facility must be collocated with B3902. No advantage exists if operations are not collocated (i.e., consolidating operations). (EA Section 2.3, Page 2-3)

Alternative 1: No Action Alternative

If the no action alternative were selected, Tinker AFB would not implement the proposed action and current inefficiencies associated with the overhaul, repair, and test of supported aircraft fuel control accessories would continue. Utilizing obsolete equipment in geographically separated facilities would continue to affect the timeline for processing each item and delay the return of aircraft to operational status. Extensive building maintenance requirements and cost for B3108 would persist. Although this alternative would not fulfill the purpose and need of the proposed action, this alternative was considered as required by the CEQ. CEQ's regulations for the implementation of NEPA stipulate that the no action alternative must be considered to assess environmental consequences that may occur if the proposed action is not implemented. (EA Section 2.3, Page 2-3)

Anticipated Environmental Consequences (EA Section 4, Page 4-1 through 4-11)

	Under Implementation of the Proposed Action:
Air Quality	A best available control technology (BACT) analysis has been presented to the Oklahoma Department of Environmental Quality (DEQ), and DEQ confirmed that no emission control devices are necessary for emissions generated from the calibration fluid. A Prevention of Significant Deterioration (PSD) permit is not required. Emissions generated by implementation of the proposed action are expected to be below *de minimus* levels and would represent a less than significant impact. Therefore, Title V permit would not need to be modified.
Noise	Impacts of the proposed action would include short-term construction noise and long-term operational noise resulting from the back-up generator. These impacts would not result in changes in noise contours. No sensitive receptors are in the vicinity of the proposed action.
Land Use	Since implementation of the proposed action would not result in changes in noise contours, implementation of the proposed action would not result in any additional land use incompatibility in the vicinity of Tinker AFB.
Geological Resources	Extensive grading and site preparation will be required to support the building and parking area. However, implementation of best management practices will mitigate these impacts.

	Under Implementation of the Proposed Action:
Water Resources	Implementation of the proposed action would require the filling of the 0.83 acre wetland to support the building, parking area, and redesign of the stormwater collection and distribution system. Other impacts include an increase in the potential for soil erosion during construction and the release of contaminants (i.e., petroleum hydrocarbons) in runoff from developed areas of the site, which could result in possible adverse impacts on water quality. As part of the proposed action, wetland habitat replacement would be implemented to compensate for the loss of wetland; best management practices (BMPs) would be implemented to minimize the potential for soil erosion during construction and the release of contaminants. Modification of National Pollutant Discharge Elimination System (NPDES) permit 000809 would be required. The US Army Corps of Engineers (USACE) does not recognize the wetland as jurisdictional, thus a Section 404 permit is not required.
Biological Resources	Implementation of the proposed action would relocate wetland habitat and require the removal of vegetation on the property. Indirect impacts to biological resources would be negligible on a regional scale.
Transportation and Circulation	Implementation of the proposed action would redirect the 76 MXW traffic from B3001 and B3108 away from the main base onto Douglas Boulevard. The proposed parking area would accommodate personnel. Constructing this building and parking area would reduce current traffic congestion and parking issues on base; however, it would increase traffic on Douglas Boulevard. Implementing the proposed action would cause negligible impacts.
Visual Resources	Changes to visual resources associated with the proposed action would include the construction of a building and parking area. The visual environment of Tinker AFB does not constitute a unique or sensitive viewshed, and no detrimental impact to local or regional visual resources would occur upon implementation of the proposed action.
Cultural Resources	No Historic Properties (36 CFR §800.16(1)(1)) are identified at either the project site or mitigation sites. The State Historic Preservation Office (SHPO) and other parties consulted under the National Historic Preservation Act, Section 106, concur in this finding. These parties also would be consulted later should unanticipated discoveries of Historic Properties become evident during the project's construction and operation. Tinker AFB has been in contact with Osage, Seminole, and Muskogee Tribes about the base as a whole. These tribes have not expressed any concern about traditional resources at the base. If cultural resources are encountered or identified during construction, activities would be suspended and the SHPO would be consulted to determine the significance of the resource(s).
Socioeconomics	Implementation of the proposed action would neither increase nor decrease the number of personnel at Tinker AFB; therefore, socioeconomic impacts would not result.
Environmental Justice and Protection of Children	Only minimal adverse impacts would result from implementation of the Proposed Action; therefore, minority and low-income populations would not be disproportionately adversely impacted. Similarly, the proposed action would not cause adverse impacts in areas supporting or frequented by concentrated populations of children. Therefore, only negligible impacts with regard to environmental justice or protection of children would occur with implementation of the proposed action.
Hazardous Materials and Wastes	As the process of overhauling, repairing, and testing of the items becomes more efficient due to the implementation of the proposed action, the rate at which hazardous materials are used and hazardous waste generated may increase. Sufficient facilities and procedures are in place to manage these additional materials and wastes. During construction, staging areas will go through proper siting and paper work.
Safety	Implementation of the proposed action would not result in changes to the frequency of aircraft operations performed at Tinker AFB. Therefore, with regard to aircraft mishaps and bird-aircraft strikes, no impacts would result from implementation of the proposed action. No new incompatible land use would be introduced as a result of implementation of the proposed action; therefore, no impacts to airfield safety would result from implementation of the proposed action.

Cumulative Impacts

Projects in addition to the proposed action in the vicinity of the Eastside Depot Maintenance District of Tinker AFB include: demolition of B3108 over the course of a five- to ten-year period. Construction of the Maintenance, Repair, and Overhaul Technology Center (MROTC) began in spring 2006 east of the current base boundary on Douglas Boulevard. The finished

facility is proposed to be 1.6 million square feet with 17 hangars on 370 acres. Currently, the MROTC has completed one hangar and the towway connected to Tinker AFB just south of the Twaddle Armed Forces Reserve Center. As part of the final phases of development of the MROTC, plans are to re-route and/or close Douglas Boulevard from public access. There are 15 other projects planned on Tinker AFB in the future, but not in the vicinity of this proposed project. The potential exists for cumulative environmental impacts to occur with regard to air quality, socioeconomics, and traffic. Cumulative air quality and noise impacts are expected to be less than significant since all projects would be required to implement Best Management Practices to reduce air and noise emissions below significant thresholds and comply with local noise regulations. If the MROTC and City's construction projects occur concurrently with the projects on Tinker AFB, short-term impacts to traffic caused by construction equipment and workers traveling along surrounding roadways could potentially cause a short-term adverse cumulative impact during peak traffic hours. (EA Section 5, Page 5-1 through 5-5)

Public Notice

A Notice of Availability for public review of the Draft EA was published in the *Daily Oklahoman* on February 10, 2006. The Draft EA was available for public review at the Midwest City Public Library. The public review period lasted for 30 days, and no public comments were received; therefore, no such comments were incorporated as part of the final EA.

Finding of No Practicable Alternative

Taking the above information into consideration, pursuant to Executive Order (EO) 11990, Protection of Wetlands, and the authority delegated by Secretary of Air Force, order 791.1, I find there is no practicable alternative to the actions proposed in the wetlands and the proposed action includes all practicable measures to minimize harm to the environment. This finding fulfills both the requirements of the referenced EO and Air Force regulation 32 CFR 989.14 for a Finding of No Practicable Alternative.

Finding of No Significant Impact

The proposed action entails the construction of a 140,000 square foot one-to-three story building consolidating all shops of 76 MXW utilized to overhaul, repair, and test aircraft fuel control accessories for supported weapons systems into one modern facility. Based upon my review of the facts and analyses contained in the EA, which is hereby incorporated by reference, I conclude that the proposed action will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality, and 32 CFR Part 989.

Signature

Date 9 Nov 07

TIMOTHY K. BRIDGES, SES
Director of Communications,
Installations and Mission Support

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FINAL

ENVIRONMENTAL ASSESSMENT: CONSTRUCTION OF CONSOLIDATED FUEL OVERHAUL AND REPAIR FACILITY

Department of the Air Force

Tinker Air Force Base, Oklahoma

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FINDING OF NO PRACTICABLE ALTERNATIVE/
FINDING OF NO SIGNIFICANT IMPACT:
CONSTRUCTION OF CONSOLIDATED FUEL OVERHAUL AND REPAIR FACILITY
TINKER AIR FORCE BASE

Pursuant to Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA; 40 Code of Federal Regulations [CFR] 1500 1508), Department of Defense (DoD) Directive 6050.1, and Air Force Regulation 32 CFR Part 989, Tinker AFB has prepared an Environmental Assessment (EA) that evaluates the potential environmental and socioeconomic impacts associated with the construction of a consolidated fuel overhaul and repair facility for Tinker Air Force Base (AFB). This EA is incorporated by reference into this finding.

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Description of Proposed Action

The Proposed Action entails the construction of a 140,000 square foot one-to-three story building on undeveloped property adjacent to B3902. This facility will replace the existing, obsolete test facility currently housed in both B3108 and portions of the B3001 overhaul facilities. The new facility will include Class 1 Division I and Division II test areas for check and test of fuel components, a Class 300000 environmental control room for fuel control overhaul, cleaning areas, material control areas, and associated support and administrative areas. A parking area of up to 200 spaces would be constructed adjacent to the building to accommodate staff. The new building would be constructed to comply with the Unified Facilities Criteria (UFC) system issued by DoD in 2002, including the *DoD Minimum Antiterrorism Standards for Buildings*, in

order to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for the DoD.
A 0.83-acre wetland currently exists at the project site near the property's northern boundary; implementation of the Proposed Action (i.e., development of the new building and parking lot) would require displacement of this existing wetland. Therefore, as part of the Proposed Action, wetland habitat of equal or greater value would be recreated at a replacement site at Reserve 3 South and Beaver Pond Marsh Filters in the southwestern portion of the base. The Proposed Action would fulfill the purpose and need of the project and also satisfy perimeter standoff requirements listed in the *DoD Minimum Antiterrorism Standards for Buildings*. However, the new building and parking lot would completely displace the existing wetland on the north side of the site.

Alternatives

There are currently no viable development alternatives because the new facility must be collocated with B3902. No advantage exists if operations are not collocated (i.e., consolidating operations).

Alternative 1: No Action Alternative.

If the No Action Alternative were selected, Tinker AFB would not implement the Proposed Action; and current inefficiencies associated with the overhaul, repair, and test of supported aircraft fuel control accessories would continue. Utilizing obsolete equipment in geographically separated facilities would continue to affect the timeline for processing each item and delay the return of aircraft to operational status. Extensive building maintenance requirements and cost for B3108 would persist. Although this alternative would not fulfill the purpose and need of the Proposed Action, this alternative was considered as required by the CEQ. CEQ's regulations for the implementation of NEPA stipulate that the No Action Alternative must be considered to assess environmental consequences that may occur if the Proposed Action is not implemented.

Anticipated Environmental Effects

	Under Implementation of the Proposed Action:
Air Quality	A best available control technology (BACT) analysis has been presented to the Oklahoma Department of Environmental Quality (DEQ), and DEQ confirmed that no emission control devices are necessary for emissions generated from the calibration fluid. A Prevention of Significant Deterioration (PSD) permit is not required. Emissions generated by implementation of the Proposed Action are expected to be below *de minimus* levels and would represent a less than significant impact. Therefore, the Title V permit would not need to be modified.
Noise	Impacts of the Proposed Action would include short-term construction noise and long-term operational noise resulting from the back-up generator. These impacts would not result in changes in noise contours. No sensitive receptors are in the vicinity of the Proposed Action.
Land Use	Since implementation of the Proposed Action would not result in changes in noise contours, implementation of the Proposed Action would not result in any additional land use incompatibility in the vicinity of Tinker AFB.

	Under Implementation of the Proposed Action:
Geological Resources	Extensive grading and site preparation would be required to support the building and parking area. However, implementation of best management practices will mitigate these impacts.
Water Resources	Implementation of the Proposed Action would require the filling of the 0.83 acre wetland to support the building, parking area, and redesign of the stormwater collection and distribution system. Other impacts include an increase in the potential for soil erosion during construction and the release of contaminants (i.e., petroleum hydrocarbons) in runoff from developed areas of the site, which could result in possible adverse impacts on water quality. As part of the Proposed Action, wetland habitat replacement would be implemented to compensate for the loss of wetland; best management practices (BMPs) would be implemented to minimize the potential for soil erosion during construction and the release of contaminants. Modification of National Pollutant Discharge Elimination System (NPDES) permit 000809 would be required. The US Army Corps of Engineers (USACE) does not recognize the wetland as jurisdictional, thus a Section 404 permit is not required.
Biological Resources	Implementation of the Proposed Action would relocate wetland habitat and require the removal of vegetation on the property. Indirect impacts to biological resources would be negligible on a regional scale.
Transportation and Circulation	Implementation of the Proposed Action would redirect the 76 MXW traffic from B3001 and B3108 away from the main base onto Douglas Boulevard. The proposed parking area would accommodate personnel. Constructing this building and parking area would reduce current traffic congestion and parking issues on base; however, it would increase traffic on Douglas Boulevard. Implementing the Proposed Action would cause negligible impacts.
Visual Resources	Changes to visual resources associated with the Proposed Action would include the construction of a building and parking area. The visual environment of Tinker AFB does not constitute a unique or sensitive viewshed, and no detrimental impact to local or regional visual resources would occur upon implementation of the Proposed Action.
Cultural Resources	No Historic Properties (36 CFR §800.16(1)(1)) are identified at either the project site or mitigation sites. The State Historic Preservation Office (SHPO) and other parties consulted under the National Historic Preservation Act, Section 106, concur in this finding. These parties also would be consulted later should unanticipated discoveries of Historic Properties become evident during the project's construction and operation. Tinker AFB has been in contact with Osage, Seminole, and Muskogee Tribes about the base as a whole. These tribes have not expressed any concern about traditional resources at the base. If cultural resources are encountered or identified during construction, activities would be suspended and the SHPO would be consulted to determine the significance of the resource(s).
Socioeconomics	Implementation of the Proposed Action would neither increase nor decrease the number of personnel at Tinker AFB; therefore, socioeconomic impacts would not result.
Environmental Justice and Protection of Children	Only minimal adverse impacts would result from implementation of the Proposed Action; therefore, minority and low-income populations would not be disproportionately adversely impacted. Similarly, the Proposed Action would not cause adverse impacts in areas supporting or frequented by concentrated populations of children. Therefore, only negligible impacts with regard to environmental justice or protection of children would occur with implementation of the Proposed Action.
Hazardous Materials and Wastes	As the process of overhauling, repairing, and testing of the items becomes more efficient due to the implementation of the Proposed Action, the rate at which hazardous materials are used and hazardous waste generated may increase. Sufficient facilities and procedures are in place to manage these additional materials and wastes. During construction, staging areas would go through proper siting and paper work. The construction contractor would be responsible to meet city and state codes. Per Tinker AFB Instructions, Section 0720, the city and state codes are part of the Request for Proposals for construction contracts.
Safety	Implementation of the Proposed Action would not result in changes to the frequency of aircraft operations performed at Tinker AFB. Therefore, with regard to aircraft mishaps and bird-aircraft strikes, no impacts would result from implementation of the Proposed Action. No new incompatible land use would be introduced as a result of implementation of the proposed action; therefore, no impacts to airfield safety would result from implementation of the Proposed Action.

Cumulative Impacts

Implementation of the Proposed Action and associated potential environmental impacts would occur concurrently with other projects and developments proposed on Tinker AFB in the Eastside Depot Maintenance District, and in the vicinity of that area of the base. In addition to the Proposed Action, other projects planned on Tinker AFB include:

- Maintenance, Repair, and Overhaul Technology Center (MROTC) Ongoing Phased Construction
- Demolition of B3108 (Fiscal Year [FY]12-20)
- Depot Maintenance and Reengineering Transformation (DMRT) Three-Bay Hangar (FY08) Construction
- Air Traffic Control Tower Construction (Possible FY08)
- Military Family Housing Privatization (FY08)
- Realignment of Air Depot Road/Tinker Gate (Possible FY08)
- Construction of Consolidated Wing Headquarters Facility (FY10/11)
- Construction of Medical Clinic (FY09)
- 507th Base Realignment and Closure (BRAC) Action (FY08)
- Phase III, 3rd Combat Communications Complex Construction (FY13)
- Oklahoma County Construction near Hruskocy Gate (FY08)
- Child Development Center Construction (FY10)
- Physical Fitness Center Construction (FY10/11)
- Defense Logistics Agency (DLA) Warehouse Construction (FY08)
- Consolidated Security Forces, South 40 Development (FY10/11)
- E-3 Airborne Warning Control System (AWACS) Parking Apron Consolidation, Charlie Row (FY13)
- Harry Twaddle Acquisition (FY10)

The projects listed above are planned for construction during roughly the same timeframe as implementation of the Proposed Action would occur. Consequently, the potential exists for cumulative environmental impacts to occur with regard to air quality, noise, socioeconomics, and traffic. Cumulative air quality and noise impacts are expected to be less than significant since all projects would be required to implement BMPs to reduce air emissions below significance thresholds and comply with local noise regulations. With regard to traffic and circulation, if the MROTC and the City's construction projects occur concurrently with the projects on Tinker AFB, short-term impacts to traffic caused by additional construction equipment and construction workers traveling along surrounding roadways could potentially cause a short-term adverse cumulative impact during peak traffic hours. However, construction will be short-term and ultimately traffic on base could be improved with the re-routing or closure of Douglas Boulevard

to public access. Therefore, cumulative impacts to transportation and circulation are expected to be less than significant.

Permits

Implementation of the Proposed Action would require modification of Tinker AFB's NPDES permit.

Permit	Permit #	Required Modifications
PSD	N/A	No modification required.
Title V Permit	99-104-TV (M-2)	No modification required.
NPDES	000809	Modification and a Tier 1 change required.
Clean Water Act, Section 404 Permit	N/A	Permit not required.
DEQ Multi-Sector General Permit (MSGP)	N/A	No modification required
Resource Conservation and Recovery Act (RCRA) Permit	OK 1571724391	No modification required.

Public Notice

A Notice of Availability for public review of the Draft EA was published in the *Daily Oklahoman* on 10 February 2006. The Draft EA was available for public review at the Midwest City Public Library. The public review period lasted for 30 days, and no public comments were received; therefore, no such comments were incorporated as part of the Final EA.

Finding of No Practicable Alternative

Pursuant to Executive Orders 11988 (*Floodplain Management*) and 11990 (*Protection of Wetlands*), in accordance with 32 CFR Section 989.14(g), under the authority delegated by Secretary of the Air Force, Order 791.1, and taking the above information into account, I find that there is no practicable alternative to this action and that the Proposed Action includes all practicable measures to minimize harm to the wetland environment. This finding fulfills both the requirements of the referenced Executive Order and Air Force *Environmental Impact Analysis Process* (32 CFR 989.14) for a Finding of No Practicable Alternative.

Finding of No Significant Impact

The Proposed Action entails the construction of a 140,000 square foot one-to-three story building consolidate all shops of the 76 MXW utilized to overhaul, repair, and test aircraft fuel control accessories for supported weapons systems into one modern facility. Based upon my review of the facts and analyses contained in the EA, which is hereby incorporated by reference, I conclude

that the Proposed Action will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality, and 32 CFR Part 989.

_____ Date_____

TIMOTHY K. BRIDGES, SES
Director of Communications, Installations
and Mission Support

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APPENDICES

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List of Acronyms

°F	degrees Fahrenheit
3 CCG	3rd Combat Communications Group
38 EIG	38th Engineering Installation Group
72 ABW	72nd Air Base Wing
76 MXW	76th Maintenance Wing
507 ARW	507th Air Refueling Wing
552 ACW	552nd Air Control Wing
AFB	Air Force Base
AFCESA	Air Force Civil Engineer Support Agency
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AGE	aerospace ground equipment
AP	Accumulation Point
ARW	Air Refueling Wing
AST	aboveground storage tank
AWAC	Airborne Warning and Control
AWACS	Airborne Warming Control System
B	Building
BACT	best available control technology
BASH	Bird/Wildlife Aircraft Strike Hazard
bgs	below ground surface
BMP	best management practice
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	corrective measure studies
CNG	Compressed Natural Gas
CO	carbon monoxide
CP	Collection Point
CSCW-1	US Navy Command Strategic Communications Wing One
CWA	Clean Water Act
DEQ	Oklahoma Department of Environmental Quality
DLA	Defense Logistics Agency
DoD	US Department of Defense
DRMO	Defense Reutilization and Marketing Office
DMRT	Depot Maintenance and Reengineering Transformation
EA	Environmental Assessment
ECAMP	Environmental Compliance Assessment and Management Program
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GWTP	Ground Water Treatment Plant
HAP	Hazardous Air Pollutant
HEP	Habitat Evaluation Procedure
HMMP	Hazardous Materials Management Program
HMMS	Hazardous Material Management System
HQ	Headquarters
HSI	Habitat Suitability Index
HU	Habitat Unit
I-	Interstate
IAP	Initial Accumulation Point
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
IWTP	Industrial Wastewater Treatment Plant
JP-	jet fuel
LLSZ	Lower-Lower Saturated Zone
LQG	Large Quantity Generator
LSZ	Lower Saturated Zone
LUC	land use control
MLRA	major land resource area
MROTC	Maintenance, Repair, and Overhaul Technology Center
MSDS	Material Safety Data Sheets
MS4	Municipal Separate Storm Sewer
MSGP	Multi-Sector General Permit
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	ozone
OC-ALC	Oklahoma City Air Logistics Center
OCC	Oklahoma Corporation Commission
ODWC	Oklahoma Department of Wildlife Conservation
ONHI	Oklahoma Natural Heritage Inventory
ORBCA	Oklahoma Risk-Based Corrective Action
OU	University of Oklahoma
OWRB	Oklahoma Water Resources Board
PA	preliminary assessment
PDM	Programmed Depot Maintenance
Pb	lead
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POL	petroleum, oil, and lubricants
PSD	Prevention of Significant Deterioration
PZ	Production Zone
QTR	Quarter

List of Acronyms (Cont.)

RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigations
RI/FS	Remedial Investigations/Feasibility Study
SIP	State Implementation Plan
SO_2	sulfur dioxide
STP	Sanitary Treatment Plant
SWPPP	StormWater Pollution Prevention Plan
TAFBI	Tinker Air Force Base Instruction
TPW	Texas Parks and Wildlife
tpy	tons per year
TSDF	Treatment, Storage and Disposal Facility
UFC	Unified Facilities Criteria
US	United States
USACE	US Army Corps of Engineers
USAF	US Air Force
USC	US Code
USDA	US Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UST	underground storage tank
USZ	Upper Saturated Zone
VOC	volatile organic compound
WSA	Waste Staging Area
WWII	World War II

SECTION 1
OVERVIEW

1.1 Introduction

An evaluation of the operational efficiency of processes within Air Force Materiel Command (AFMC) at Tinker Air Force Base (AFB), Oklahoma has been recently completed which found that maintenance, repair, and overhaul depots must improve operational and financial performance. The Oklahoma City Air Logistics Center (OC-ALC), one of three depot level maintenance facilities in the AFMC and located at Tinker AFB, is subject to these findings. To address the findings of the evaluation, the OC-ALC has developed a systematic approach that focuses on the efficiency of the operation as a whole rather than on individual improvements. The OC-ALC determined through reflection on daily activities that its supporting facility infrastructure, equipment, processes, and personnel are operating with less than optimal flow, facility constraints, and outdated equipment (Tinker AFB 2005a; 2005b).

The 76th Maintenance Wing (76 MXW) – one of three wings that comprise the OC-ALC – has a mission to overhaul, repair, and test aircraft fuel control accessories for certain first line weapons systems. The OC-ALC has determined that the 76 MXW's current operations are inefficient: these operations are conducted using obsolete equipment and are performed in three buildings (Buildings 3001, 3108, and 3902), the first two of which would require major improvements to enable effective continuation of the mission. The United States Air Force (USAF) proposes to construct a consolidated overhaul, repair, and test facility to support the 76 MXW in accordance with current standards, codes, and United States Department of Defense (DoD) force protection requirements and consistent with AFMC polices to improve operations that allow a more feasible and economic support system.

This Environmental Assessment (EA) addresses the potential impacts of the Proposed Action on the human and natural environment as required by the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [USC] §§ 4321-4347), and in accordance with the Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508) and Air Force Instruction (AFI) 32-7061 entitled Environmental Impact Analysis Process (32 CFR Part 989).

1.2 Purpose and Need

The purpose of the Proposed Action is to consolidate into one facility all shops required to conduct the 76 MXW's mission of overhauling, repairing, and testing aircraft fuel control accessories in support of first line weapons systems. Consolidation of these facilities would improve the operational process, increase productivity, and improve efficiency to provide the USAF with a reliable and responsive facility that operates at the required level of production.

Currently, the 76 MXW conducts its overhaul, repair, and test activities using obsolete equipment in three buildings, two of which were constructed in 1943: Building 3001 (B3001) and Building 3108 (B3108). Since the 76 MXW performs these activities in three separate buildings, current operations require that items: 1) be repaired or overhauled in environmental controlled areas within B3001, then 2) be transported approximately 0.25 mile to B3108 or 0.90 mile to Building 3902 (B3902), built in 1995, for final testing and acceptance. The mandatory transport of items between buildings that is required to complete (and deem acceptable) overhaul, repair, and test activities results in significant time loss and operational inefficiency. Further, this time loss causes delays in meeting production schedules and extends the time aircraft must be out of service. Consolidating all shops into one facility would enable a streamlined and efficient process by collocating operations and decreasing processing time.

Modernization of equipment and facilities would further increase efficiency in processing fuel control accessories and would reduce operational costs. Major improvements are currently needed at both B3108 and B3001 to enable successful execution of 76 MXW's mission. B3108 is constructed with asbestos siding, contains outdated electrical systems, and lacks hazardous material spill containment as required by the Uniform Building Code and the National Fire Code; excessive maintenance and renovation costs are required to enable continued use of this building. The initial Best Available Control Technology (BACT) analysis conducted by Tinker AFB concluded that retrofitting B3108 with control devices was not feasible due to the age of the building, environmental issues, and economics, and that a BACT analysis must be conducted to suit the new facility (Tinker AFB 2007b). Tinker AFB will leave B3108 in place at this time; however demolition of B3108 is planned within the next five to twelve years. An estimated $1.5 million renovation is required for the environmental controlled areas in B3001 to meet current standards. Relocation of the 76 MXW's overhaul, repair, and test functions into a single, consolidated facility is estimated to result in an increase efficiency of that process by 20 percent (Tinker AFB 2007b).

1.3 Location, History and Current Mission

1.3.1 Tinker AFB

Tinker AFB is located within the city limits of Oklahoma City, Oklahoma (Figure 1-1). This facility is bordered to the north by Interstate 40 (I-40) and 29th Street, to the east by Douglas Boulevard, to the south by 74th Street, and to the west by Sooner Road. Midwest City is located north and Del City is located northwest and west of Tinker AFB.

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EA

Regional Location
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
1-1

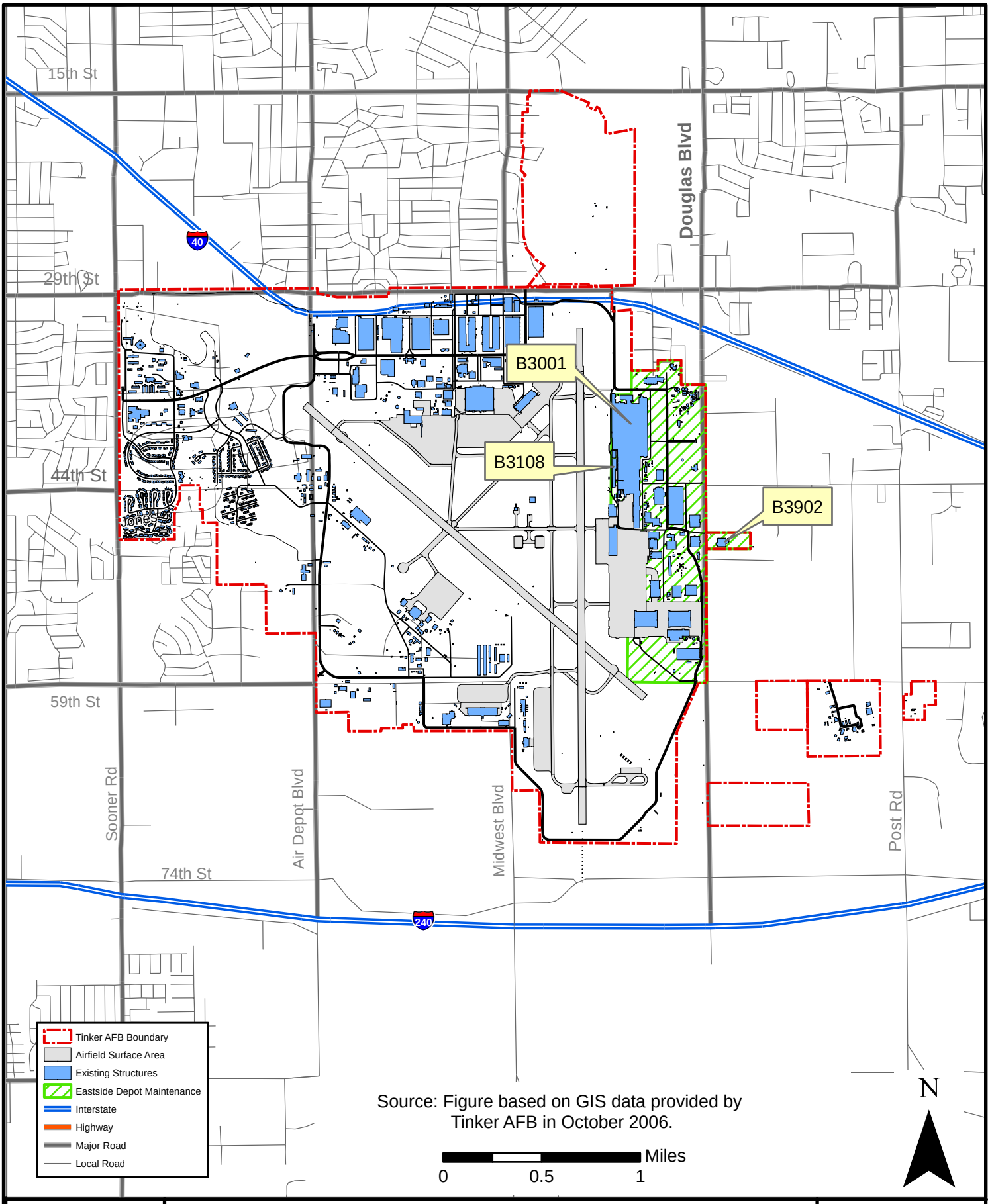
Since its establishment as the Oklahoma Air Depot in 1941, Tinker AFB has expanded its real property assets from approximately 1,500 acres to more than 5,033 acres. The west side of the installation was named Tinker Field in 1942 to honor Major General Clarence L. Tinker, an Oklahoman who died leading bombers on a strike against the Japanese at Wake Island in World War II (WWII). After WWII, the base was expanded to include the Douglas Cargo Aircraft Plant, which was located on the east side of the installation. A management systems overhaul occurred at the base in the 1950s to accommodate the B-52 Bomber and the KC-135 tanker (Tinker AFB 2005a).

In the 1960s, 1970s, and 1980s, the base acquired maintenance responsibilities for additional aircraft, engines, and equipment; the additional associate organizations and responsibilities resulted in an increase in both civilian and military personnel. In the 1970s, the base took over management of new weapons including the A-7D Corsair, the E-3A Airborne Warning and Control (AWAC) aircraft, the E-4 Airborne Command Post aircraft, and the air- and ground-launched missiles. In 1974, the depot was renamed the OC-ALC.

Currently, Tinker AFB is located on more than 5,033 acres of Federal land, containing 716 buildings (comprising 15.9 million square feet), an airfield, and other facilities that support various associate units at the base (Figure 1-2). Tinker AFB is divided into seven districts, each with specific land uses, providing specialized logistics support, management, maintenance, and distribution to defense weapons systems worldwide. Various associate units are located at the base, including the OC-ALC, the 552nd Air Control Wing (552 ACW), the 507th Air Refueling Wing (507 ARW), the U.S. Navy Command Strategic Communications Wing One (CSCW-1), the 3rd Combat Communications Group (3 CCG), the 38th Engineering Installation Group (38 EIG), and the 72nd Air Base Wing (72 ABW). The 72 ABW is the host organization for Tinker AFB and provides critical base-wide functions including security, medical services, civil engineering, fire protection, supply, communications, Environmental Management, the Comptroller Squadron, and airfield operations. The proposed project would affect the operations and facilities associated with the OC-ALC and the 76 MXW.

1.3.2 OC-ALC and 76 MXW

The OC-ALC is the largest of the three ALCs in the AFMC and is a worldwide manager for a wide range of aircraft, engines, missiles, software, avionics, and accessories components. The OC-ALC is responsible for depot level maintenance of the B-1B Lancer, the E-3 Sentry, B-52, C/KC-135, the E-6B Mercury, and the management of 25 other Contractor Logistics Support aircraft. The center also oversees 23,000 aircraft engines and a multitude of mission systems. Airborne accessories management includes responsibility for 24,000 different avionics and accessories components (Tinker AFB 2005a).



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EA

Layout Map
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
1-2

The OC-ALC operates facilities throughout Tinker AFB; however, most of its facilities are located on the eastern side of the base in the Eastside Maintenance Depot District. This area contains administrative and warehouse space, aircraft maintenance hangars, and test facilities that support depot maintenance. Three wings comprise the OC-ALC:

- 327th Aircraft Sustainment Wing
- 448th Combat Sustainment Wing
- 76 MXW

The OC-ALC provides depot maintenance, product support, services, and supply chain management for 31 weapons systems, 10 commands, 93 AFBs, and 46 foreign nations. The OC-ALC manages an inventory of 1,416 aircraft, 23,000 engines, and 24,000 exchangeable or commodity items and is responsible for the management of certain major air launched missile systems including the Short Range Attack Missile and Harpoon. The 76 MXW is responsible for overhauling, repairing, and testing fuel control accessories for the following weapons systems: A-10, B-1B, B-2B, B-52H, C-130, C-135, C-141, CH-53, E-3, F-14, F-15, F-16, TF-37, C-5, and C-17 aircraft. The 76 MXW currently conducts this mission in B3001, B3108, and B3902 in the Eastside Maintenance Depot District.

1.4 Summary of Environmental Study Requirements

The Environmental Impact Analysis Process (EIAP) is the process by which Federal agencies facilitate compliance with environmental regulations. NEPA is the primary legislation affecting these agencies' decision-making process. This act and other facets of the EIAP are described below.

1.4.1 National Environmental Policy Act

The NEPA requires that Federal agencies consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed Federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing Federal policies as they relate to this process. In 1978, the CEQ issued Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§1500-1508 [CEQ 1978]). The Air Force developed its own procedural regulations for implementing NEPA entitled Environmental Impact Analysis Process (AFI32-7061, codified at 32 CFR Part 989). These regulations specify that an EA be prepared to:

- briefly provide sufficient analysis and evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI);
- aid in an agency's compliance with NEPA when no EIS is necessary; and
- facilitate preparation of an EIS when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the Safe Drinking Water Act, Endangered Species Act [ESA], and National Historic Preservation Act [NHPA]), and to assess potential environmental impacts, the EIAP and decision-making process for the proposed action involves a thorough examination of all environmental issues pertinent to the action. The decision-making process includes a study of environmental issues related to the proposed construction and operations changes at Tinker AFB.

1.4.2 Interagency and Intergovernmental Coordination for Environmental Planning

Public involvement is a useful component of the EA process; it includes both agencies and members of the public. Public involvement occurs primarily during the public comment period.

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) is a federally mandated process for informing and coordinating with other governmental agencies regarding proposed actions. As detailed in 40 CFR § 1501.4(b), CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the IICEP process, the USAF notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a proposed action. Comments and concerns submitted by these agencies during the IICEP process are subsequently incorporated into the analysis of potential environmental impacts conducted as part of the EA.

A draft EA was issued and the document was sent directly to identified agencies, a notice of availability was published in the *Daily Oklahoman*, and copies of the draft EA were located at the Midwest City Library on 10 February 2006. Upon publication of the notice of availability and placement of the EA in the public library, the 30-day public comment period began. During the public comment period, all interested individuals were able to request to view a copy of the draft EA at the selected library and were able to submit written comments. From the period of February 2006 to July 2007, the original EA was revised to reflect comments received from USAF review. The EA was reformatted and revised to conform with AFMC approval. No changes were made to the Proposed Action. The State Historic Preservation Office (SHPO) and Oklahoma Archeological Survey concurred with the Proposed Action and sent letters in April 2007 (Appendix A). Tinker AFB as been in contact with the Osage, Seminole, and Muskogee tribes about the base as a whole and none of these tribes have expressed any concern about actions on the base. No further public comments were received; therefore, no such comments were incorporated as part of the Final EA.

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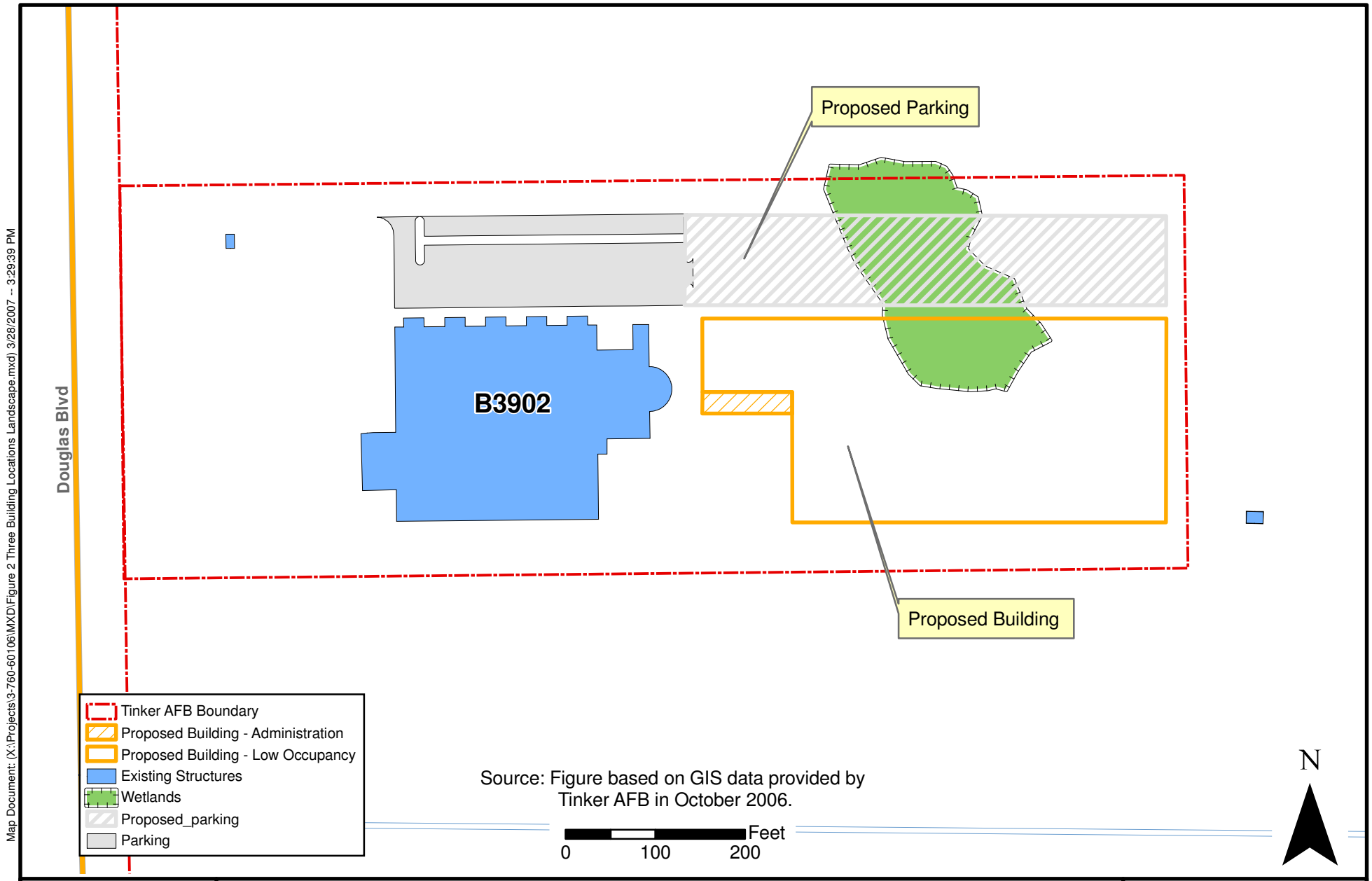
SECTION 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The USAF has determined that a new building is necessary to correct inefficiencies identified in the current processes and facilities utilized for the overhaul, repair, and testing of aircraft fuel control accessories at Tinker AFB. Further, locating the new building adjacent to B3902 would maximize operational efficiency by collocating facilities and functions. Approximately 13.3 acres of available undeveloped, USAF-owned property located immediately east of B3902 in the Eastside Maintenance Depot District of Tinker AFB, outside the main perimeter of the base, has been identified as suitable for supporting the new building. The new building must be constructed to comply with the Unified Facilities Criteria (UFC) system issued by the DoD in 2002, including the DoD Minimum Antiterrorism Standards for Buildings, in order to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for the DoD (DoD 2003). The standards provide appropriate, implementable, and enforceable measures to establish a level of protection against terrorist attacks. The intent of these standards is achieved through prudent planning, real estate acquisition, and design and construction practices; these standards apply to new facilities and to existing facilities when undergoing major investments, conversion of use, building additions, or glazing replacement. As required by NEPA, the potential impacts of the Proposed Action on the human and natural environment must be evaluated, and reasonable alternatives to the Proposed Action must be considered.

2.2 Proposed Action

The Proposed Action (Project Number: WWYK043008) entails the construction of a 140,000-square foot, one to three-story building on the undeveloped property adjacent to B3902 (Figure 2-1). Figure 2-1 represents a purely conceptual footprint and is not a building design. The final building configuration would be designed following award of a design/build contract to implement the Proposed Action. The building would be constructed on drilled piers with a concrete slab and contain masonry walls with a structural steel frame, exterior brick veneer finish, and a sloped metal roof (USAF 2007). The facility would provide space for shops, controlled areas, and administrative support. This facility would replace the existing, obsolete test facility in B3108 and portions of the B3001 overhaul facilities. The new facility would include Class 1 (hazardous location for flammable gases or vapors) Division I (normal, everyday operations) and Division II (enclosed systems/containers) test areas for check and test of fuel components, a Class 300000 (same as a normal home environment) environmental control room for fuel control overhaul, cleaning areas, material control areas, and associated support and administrative areas. A parking area of up to 200 spaces would be constructed adjacent to the building to accommodate staff. The proposed facility (Building 3907) would be constructed adjacent to the Consolidated Fuel Controls Test Building (B3902) to minimize the required



EA

Proposed Action (Conceptual Footprint)
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
2-1

transport time and distance for repaired fuel system parts. The Proposed Action also includes pavement and site improvements, utilities, exterior lighting, and fire protection. This project would require extensive grading and landscaping, as well as the installation of industrial utilities, which are currently established across Douglas Boulevard from the Proposed Action location. Currently, there are electrical and communications capacity for B3902; however, there is not enough capacity to accommodate the proposed facility. Therefore, additional electrical and communication lines would need to be brought from across Douglas Boulevard. The new consolidated facility would be able to tie into the existing water main and industrial waste line currently used by B3902 on the east side of Douglas Boulevard. Existing equipment utilized by the 76 MXW for the fuel control overhaul, repair, and test mission would be removed from B3108 and B3001 and relocated to the new consolidated facility. No renovation or demolition is currently proposed for B3001; however, B3108 is scheduled for demolition within the next five to twelve years.

The Proposed Action would fulfill the purpose and need of the project and also satisfy perimeter standoff requirements listed in the DoD Minimum Antiterrorism Standards for Buildings by constructing both the facility and parking areas on the east side rather than the west side of B3902. Standoff of parking and roadways to the current building, B3902, and the proposed facility is 45 meters.

A non-jurisdictional wetland currently exists at the project site near the property's northern boundary; implementation of the Proposed Action (i.e., development of the new building and parking lot) would require displacement of this existing wetland. Therefore, as part of the Proposed Action, wetland habitat of equal or greater value would be created at a replacement site at Reserve 3 South and Beaver Pond Marsh Filters in the southwest portions of the base. Details on wetland habitat replacement are presented in *Section 4.2.1.1*.

2.3 Alternatives

Alternative configurations of the new facility and parking lot were evaluated; however, all but one alternative were eliminated from further consideration because selection criteria was not met. One alternative to the Proposed Action was identified, the No-Action Alternative. This alternative's adequacy for implementing the project's objectives was evaluated.

2.3.1 Alternative 1: No-Action Alternative

Under the No-Action Alternative, Tinker AFB would not implement the Proposed Action, and current inefficiencies associated with the overhauling, repairing, and testing of the supported aircraft fuel control accessories would continue. Utilizing obsolete equipment in geographically separated facilities would continue to affect the timeline for processing each item and delay the return of the aircraft to operational status. Extensive building maintenance requirements and cost for B3108 would persist.

Although this alternative would not fulfill the purpose and need of the Proposed Action, this alternative will be carried forward as required by the CEQ. CEQ's regulations for the implementation of NEPA stipulate that the No Action Alternative must be considered to assess environmental consequences that may occur if the Proposed Action is not implemented.

2.4 Selection Criteria and Alternatives Eliminated From Consideration and Not Carried Forward

Several alternatives were considered but eliminated and not carried forward due to the following selection criteria:

- The purpose of consolidation of buildings and facilities is to improve inefficiencies in time and function by collocating facilities associated with B3902, which currently tests the aircraft fuel control accessories.
- Land availability on Tinker AFB is limited.
- Size of available land is not adequate to accommodate the space required for the consolidated facility.
- A cost-benefit analysis report for this project, *Economic Analysis, Consolidated Fuel Overhaul, Repair, and Test Facility, Tinker AFB* (Appendix B), recommends new construction as the preferred alternative that will achieve savings based upon conservative industry benchmarks and will produce substantial savings in direct labor, direct materials, and overhead (Tinker AFB 2005c). During the cost benefit analysis, qualitative benefits were identified and assigned numeric weights by a panel of functional experts from the 76th Commodities Maintenance Group. Benefits were rated on importance. These benefits include:

    a. *Mission Accomplishment*: measures the extent to which the alternative has a positive impact on the 76th Commodities Maintenance Group's mission accomplishment.

    b. *Accessibility*: evaluates the extent to which the facility in a given alternative is accessible to 76th Commodities Maintenance Group handicapped and physically challenged personnel.

    c. *Facility Adequacy*: assesses the extent to which an alternative meets the facility needs of the 76th Commodities Maintenance Group.

    d. *Health/Safety*: measures the degree to which the alternative promotes the health and safety of 76th Commodities Maintenance Group personnel.

    e. *Security*: measures the extent to which an alternative enables the 76th Commodities Maintenance Group to protect the resources and personnel it houses.

f. *Morale*: measures the extent to which the alternative has a positive impact on morale.

The cost factors evaluated in this analysis include:

a. total present value of investment

b. present value of existing assets to be used

c. present value of existing assets to be replaced

d. present value of proposed alternative salvage value

e. present value of differential costs

f. recurring costs that include transportation time, annual maintenance, periodic maintenance, utilities, direct labor, direct material, and overhead

Using the benefit and cost factors analysis, the report concluded that new construction would provide greater benefit than leaving B3001 and B3108 as is or renovating both buildings (Tinker 2005c) (Appendix B).

- Using the previously described selection criteria, Tinker AFB examined an alternate building configuration that would avoid an existing wetland adjacent to B3902. Under this alternative, the Consolidated Fuel Overhaul and Repair Facility would be one-to-three stories and approximately 140,000 square feet. Due to the limited available space and the location of the wetland, perimeter standoff requirements specified in the DoD Minimum Antiterrorism Standards for Buildings would not be satisfied; further, the parking area would not meet space requirements for the number of employees at this facility. This alternative was not considered practicable because it would meet neither required perimeter standoff requirements nor facility and parking size requirements. Therefore, this alternative was eliminated from consideration.

2.5 Reasonably Foreseeable Concurrent Actions

Implementation of the Proposed Action and associated potential environmental impacts would occur concurrently with other projects and developments proposed on Tinker AFB in the Eastside Depot Maintenance District, and in the vicinity of that area of the base. In addition to the Proposed Action, other projects planned on Tinker AFB include:

- Maintenance, Repair, and Overhaul Technology Center (MROTC) Ongoing Phased Construction
- Demolition of B3108 (Fiscal Year [FY]12-20)
- Depot Maintenance and Reengineering Transformation (DMRT) Three-Bay Hangar (FY08) Construction
- Air Traffic Control Tower Construction (Possible FY08)

- Military Family Housing Privatization (FY08)
- Realignment of Air Depot Road/Tinker Gate (Possible FY08)
- Construction of Consolidated Wing Headquarters Facility (FY10/11)
- Construction of Medical Clinic (FY09)
- 507th Base Realignment and Closure (BRAC) Action (FY08)
- Phase III, 3rd Combat Communications Complex Construction (FY13)
- Oklahoma County Construction near Hruskocy Gate (FY08)
- Child Development Center Construction (FY10)
- Physical Fitness Center Construction (FY10/11)
- Defense Logistics Agency (DLA) Warehouse Construction (FY08)
- Consolidated Security Forces, South 40 Development (FY10/11)
- E-3 Airborne Warning Control System (AWACS) Parking Apron Consolidation, Charlie Row (FY13)
- Harry Twaddle Acquisition (FY10)

The projects listed above and their associated cumulative impacts were further discussed and analyzed in *Section 5, Cumulative Impacts*.

2.6 Summary of Potential Impacts

Potential impacts were evaluated and are described in *Section 4, Environmental Consequences*. Table 2-1 provides a summary of the potential impacts for resource areas fully evaluated and associated with the Proposed Action and the No Action Alternative. Table 2-2 provides a summary of resource areas that were not evaluated further due to no impacts to those resources from the Proposed Action and the No Action Alternative.

Table 2-1. Summary of Impacts for Fully Evaluated Resources

Resource/ Issue	Proposed Action	No Action Alternative
Air Quality	A best available control technology (BACT) analysis has been presented to the Oklahoma Department of Environmental Quality (DEQ), and DEQ confirmed that no emission control devices are necessary for emissions generated from the calibration fluid. A Prevention of Significant Deterioration (PSD) permit is not required. Emissions generated by implementation of the Proposed Action are expected to be below *de minimus* levels and would represent a less than significant impact. Therefore, Title V permit would not need to be modified.	Conditions would remain as described in *Section 3.1, Air Quality*.

Table 2-1. Summary of Impacts for Fully Evaluated Resources (Cont.)

Resource/ Issue	Proposed Action	No Action Alternative
Water Resources	Implementation of the Proposed Action would require the filling of the 0.83 acre wetland to support the building, parking area, and redesign of the stormwater collection and distribution system. Other impacts include an increase in the potential for soil erosion during construction and the release of contaminants (i.e., petroleum hydrocarbons) in runoff from developed areas of the site, which could result in possible adverse impacts on water quality. As part of the Proposed Action, wetland habitat replacement would be implemented to compensate for the loss of wetland; best management practices (BMPs) would be implemented to minimize the potential for soil erosion during construction and the release of contaminants. Modification of National Pollutant Discharge Elimination System (NPDES) permit 000809 would be required. The US Army Corps of Engineers (USACE) does not recognize the wetland as jurisdictional, thus a Section 404 permit is not required.	Conditions would remain as described in *Section 3.2, Water Resources*.
Biological Resources	Implementation of the Proposed Action would relocate wetland habitat and require the removal of vegetation on the property. Indirect impacts to biological resources would be negligible on a regional scale.	Conditions would remain as described in *Section 3.3, Biological Resources.*
Transportation and Circulation	Implementation of the Proposed Action would redirect the 76 MXW traffic from B3001 and B3108 away from the main base onto Douglas Boulevard. The proposed parking area would accommodate personnel. Constructing this building and parking area would reduce current traffic congestion and parking issues on base; however, it would increase traffic on Douglas Boulevard. Implementing the Proposed Action would cause negligible impacts.	Conditions would remain as described in *Section 3.4, Transportation and Circulation.*
Hazardous Materials and Waste	As the process of overhauling, repairing, and testing of the items becomes more efficient due to the implementation of the Proposed Action, the rate at which hazardous materials are used and hazardous waste generated may increase. Sufficient facilities and procedures are in place to manage these additional materials and wastes. During construction, staging areas will go through proper siting and paper work. The construction contractor would be responsible to meet city and state codes. Per Tinker AFB Instructions, Section 0720, the city and state codes are part of the Request for Proposals for construction contracts.	Conditions would remain as described in *Section 3.5, Hazardous Materials and Waste.*

Table 2-2. Summary of No Impact for Resources Not Evaluated Further

Resource/ Issue	Proposed Actions	No Action Alternative
Noise	Impacts of the Proposed Action would include short-term construction noise and long-term operational noise resulting from the back-up generator. These impacts would not result in changes in noise contours. No sensitive receptors are in the vicinity of the Proposed Action.	Conditions would remain the same as existing conditions.
Land Use	Since implementation of the Proposed Action would not result in changes in noise contours, implementation of the Proposed Action would not result in any additional land use incompatibility in the vicinity of Tinker AFB.	Conditions would remain the same as existing conditions.
Geological Resources	Extensive grading and site preparation will be required to support the building and parking area. However, implementation of best management practices will mitigate these impacts.	Conditions would remain the same as existing conditions.
Visual Resources	Changes to visual resources associated with the Proposed Action would include the construction of a building and parking area. The visual environment of Tinker AFB does not constitute a unique or sensitive viewshed, and no detrimental impact to local or regional visual resources would occur upon implementation of the Proposed Action.	Conditions would remain the same as existing conditions.
Cultural Resources	No Historic Properties (36 CFR §800.16(1)(1)) are identified at either the project site or mitigation sites. The State Historic Preservation Office (SHPO) and other parties consulted under the National Historic Preservation Act, Section 106, concur in this finding. These parties also would be consulted later should unanticipated discoveries of Historic Properties become evident during the project's construction and operation. Tinker AFB has been in contact with Osage, Seminole, and Muskogee Tribes about the base as a whole. These tribes have not expressed any concern about traditional resources at the base. If cultural resources are encountered or identified during construction, activities would be suspended and the SHPO would be consulted to determine the significance of the resource(s).	Conditions would remain the same as existing conditions.

Table 2-2. Summary of No Impact for Resources Not Evaluated Further (Cont.)

Resource/ Issue	Proposed Actions	No Action Alternative
Socioeconomics	Implementation of the Proposed Action would neither increase nor decrease the number of personnel at Tinker AFB; therefore, socioeconomic impacts would not result.	Conditions would remain the same as existing conditions.
Environmental Justice and Protection of Children	Only minimal adverse impacts would result from implementation of the Proposed Action; therefore, minority and low-income populations would not be disproportionately adversely impacted. Similarly, the Proposed Action would not cause adverse impacts in areas supporting or frequented by concentrated populations of children. Therefore, only negligible impacts with regard to environmental justice or protection of children would occur with implementation of the Proposed Action.	Conditions would remain the same as existing conditions.
Safety	Implementation of the Proposed Action would not result in changes to the frequency of aircraft operations performed at Tinker AFB. Therefore, with regard to aircraft mishaps and bird-aircraft strikes, no impacts would result from implementation of the Proposed Action. No new incompatible land use would be introduced as a result of implementation of the proposed action; therefore, no impacts to airfield safety would result from implementation of the Proposed Action.	Conditions would remain the same as existing conditions.

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SECTION 3
AFFECTED ENVIRONMENT

This section describes relevant existing environmental conditions for resources potentially affected by implementation of the Proposed Action and identified alternatives. In compliance with NEPA, CEQ regulations, UFC 3 260-01, and 32 CFR 989, the description of the affected environment focuses on only those aspects potentially subject to impacts (Air Force Civil Engineer Support Agency [AFCESA] 2006).

In the case of the Proposed Action, the affected environment description is limited primarily to Tinker AFB and Oklahoma County. Resource descriptions focus on the following areas: air quality, water resources, biological resources, transportation and circulation, and hazardous materials and wastes.

3.1 Air Quality

3.1.1 Definition of Resource

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. National Ambient Air Quality Standards (NAAQS) are established by the US Environmental Protection Agency (USEPA) under the Clean Air Act (CAA) for criteria pollutants, including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than ten microns in diameter (PM_{10}) and 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare.

3.1.1.1 Criteria Pollutants

Air quality is affected by emissions from stationary sources (e.g., industrial development) and mobile sources (e.g., motor vehicles). Air quality at a given location is a function of several factors, including the quantity and type of pollutants emitted locally and regionally, and the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersion are wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and topography.

Ozone. The majority of ground-level (terrestrial) O_3 is formed as a result of complex photochemical reactions in the atmosphere involving volatile organic compounds (VOCs), nitrogen oxides (NO_x), and oxygen. O_3 is a highly reactive gas that damages lung tissue, reduces lung function, and sensitizes the lung to other irritants. Although stratospheric O_3 shields the earth from damaging ultraviolet radiation, terrestrial O_3 is a highly damaging air pollutant and is the primary source of smog. As of June 2004, USEPA issued the final rule for 8-hour O_3, revising the 1 hour O_3 NAAQS standard. The 8-hour standard is more protective of public health and more stringent than the 1-hour standard, and non-attainment areas for 8-hour O_3 are now designated.

Carbon Monoxide. CO is a colorless, odorless, poisonous gas produced by incomplete burning of carbon in fuel. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina and peripheral vascular disease.

Nitrogen Dioxide. NO_2 is a highly reactive gas that can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Repeated exposure to high concentrations of NO_2 may cause acute respiratory disease in children. Because NO_2 is an important precursor in the formation of O_3 or smog, control of NO_2 emissions is an important component of overall pollution reduction strategies. The two primary sources of NO_2 in the US are fuel combustion and transportation.

Sulfur Dioxide. SO_2 is emitted primarily from stationary source coal and oil combustion, steel mills, refineries, pulp and paper mills, and from non-ferrous smelters. High concentrations of SO_2 may aggravate existing respiratory and cardiovascular disease; asthmatics and those with emphysema or bronchitis are the most sensitive to SO_2 exposure. SO_2 also contributes to acid rain, which can lead to the acidification of lakes and streams and damage trees.

Particulate Matter (PM_{10} and $PM_{2.5}$). PM is a mixture of tiny particles that vary greatly in shape, size, and chemical composition, and can be comprised of metals, soot, soil, and dust. PM_{10} includes larger, coarse particles, whereas $PM_{2.5}$ includes smaller, fine particles. Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Sources of fine particles include all types of combustion activities (e.g., motor vehicles, power plants, wood burning) and certain industrial processes. Exposure to PM_{10} and $PM_{2.5}$ levels exceeding current standards can result in increased lung- and heart-related respiratory illness. USEPA has concluded that finer particles are more likely to contribute to health problems than those greater than 10 microns in diameter.

Airborne Lead. Airborne lead can be inhaled directly or ingested indirectly by consuming lead-contaminated food, water, or non-food materials such as dust or soil. Fetuses, infants, and children are most sensitive to Pb exposure, which has been identified as a factor in high blood pressure and heart disease. Exposure to Pb has declined dramatically in the last 10 years as a result of the reduction of Pb in gasoline and paint, and the elimination of Pb from soldered cans.

3.1.1.2 Clean Air Act Amendments

The Clean Air Act Amendments (CAAA) of 1990 place most of the responsibility to achieve compliance with NAAQS on individual states. To this end, USEPA requires each state to prepare a State Implementation Plan (SIP). A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all NAAQS. Areas not in compliance with a standard can be declared nonattainment areas by USEPA or the appropriate state or local agency. In order to reach attainment status, NAAQS may not be exceeded more than once per year. A nonattainment area can reach attainment when NAAQS have been met for a period of ten consecutive years. During this time period the area is in transitional attainment, also termed maintenance.

3.1.2 Existing Conditions

3.1.2.1 Climate

Oklahoma County is located in the Interior Lowlands physiographic region. The County has two major land resource areas (MLRA): the eastern half of the county is in the Northern Cross Timbers MLRA and the western half is in the Central Rolling Red Prairies MLRA (US Department of Agriculture [USDA] 2003). In winter, the average daily temperature is 38.6 degrees Fahrenheit (°F), and the average daily minimum temperature is 27.8°F. In summer the average temperature is 80°F, and the average daily maximum temperature is 91.1°F. The average annual precipitation is 33.35 inches. The majority of precipitation, 74 percent, usually falls from April through October; average seasonal snowfall is 9.1 inches. Prevailing winds blow from the south with the average speed of 14 miles per hour in March and April (USDA 2003).

3.1.2.2 Local Air Quality

Oklahoma County is currently designated by the USEPA as an attainment area for all carbon monoxide, sulfur dioxide, and particulate matter (PM_{10} and $PM_{2.5}$). Oklahoma has entered into an Early Action Compact Agreement with the USEPA for the 8-hour ozone standard and has deferred attainment classification. Ten air quality monitoring stations are located within Oklahoma County, including one CO monitoring station, one PM_{10} monitoring station, two $PM_{2.5}$ monitoring stations, one SO_2 monitoring station, three ozone monitoring stations, and two NO_2 monitoring stations. According to USEPA AirData, concentrations of PM_{10}, $PM_{2.5}$, NO_2, and CO have not exceeded the primary NAAQS during the past 10 years (USEPA 2007). According to USEPA AirData, concentrations of ozone have exceeded the 8-hour NAAQS in the past 10 years (USEPA 2007). In addition to criteria pollutants, the DEQ Air Quality Division regulates incinerators, particulate matter, cotton gins, smoke, and odors (DEQ 2006).

3.1.2.3 Tinker AFB and Proposed Project Location

DEQ – which publishes regulations for air quality and permitting for all counties in Oklahoma – has jurisdiction over and regulates air emissions associated with Tinker AFB. Tinker AFB is located within Oklahoma County, which is in an Early Action Compact Agreement with USEPA for 8-hour ozone and in attainment for all other criteria pollutants.

Under the CAAA, the Title V Operating Permit Program imposes requirements for air quality permitting on air emission sources. Tinker AFB is categorized as a major source under the Title V program since its potential emissions from stationary sources exceed 100 tons per year (tpy) of any of the criteria pollutants, or 10 tpy of any single Hazardous Air Pollutant (HAP), or 25 tpy of any combination of HAPs. Also under the CAAA, the National Emission Standards for Hazardous Air Pollutants (NESHAP) program specifies various provisions for regulated sources, including limits on HAP emissions, compliance demonstrations and performance testing,

monitoring, record keeping, and reporting. The NESHAP program applies to Tinker AFB since potential emissions of any single HAP equals or exceeds 10 tpy and a combination of HAPs equals or exceeds 25 tpy. Tinker AFB maintains a Title V Air Permit (December 2006). Primary on-site emission sources at the Tinker AFB include:

- stationary combustion sources (boilers, water heaters, furnaces, gasoline and diesel-fuel generators, arresting barrier engines, engine test cells);
- operational sources (chemical usage, paints, degreasers, woodworking, abrasive blasting, welding operations, fuel cell maintenance, wastewater treatment, small arms firing range);
- fuel-storage/transfer operations (horizontal tanks, internal floating roof tanks, fuel transfer losses); and
- mobile sources (vehicle operations, aircraft operations, trim and power checks, aerospace ground equipment [AGE]).

The proposed Consolidated Fuel Overhaul and Repair Facility would be developed on property located east of Douglas Boulevard that is owned by Tinker AFB. Currently, B3902 – which houses fuel component testing functions – and undeveloped land comprise the 6-acre parcel containing the project development site. No activities or development occurs on or adjacent to this property that generates emissions uncharacteristic of the base or regional environment.

3.2 Water Resources

3.2.1 Definition of Resource

Water resources analyzed in this EA include surface and groundwater resources, including the quality and availability of surface and groundwater, wetlands, and the potential for flooding. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons including economic, ecological, recreational, and human health. Groundwater includes the subsurface hydrologic resources of the physical environment and is an essential resource in many areas; groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition.

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and USEPA as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. As defined in 1984, wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR 328.3 [b]). Wetlands provide a variety of functions including groundwater recharge and discharge; floodflow alteration; sediment stabilization; sediment and toxicant retention; nutrient removal and transformation; aquatic and terrestrial diversity and abundance; and uniqueness. Three criteria are necessary to

define wetlands: vegetation (hydrophytes), soils (hydric), and hydrology (frequency of flooding or soil saturation). Hydrophytic vegetation is classified by the estimated probability of occurrence in wetland versus upland (non-wetland) areas throughout its distribution. Hydric soils are those that are saturated, flooded, or ponded for sufficient periods during the growing season and that develop anaerobic conditions in their upper horizons (i.e., layers). Wetland hydrology is determined by the frequency and duration of inundation and soil saturation; permanent or periodic water inundation or soil saturation is considered a significant force in wetland establishment and proliferation. Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the Clean Water Act (CWA); Executive Order (EO) 11990, Protection of Wetlands, requires analyses of potential impacts to wetlands related to proposed Federal actions.

Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 100-year floodplains. Floodplains are belts of low, level ground present on one or both sides of a stream channel and are subject to either periodic or infrequent inundation by flood water. Inundation dangers associated with floodplains have prompted Federal, state, and local legislation that limits development in these areas largely to recreation and preservation activities. EO 11988, Floodplains Management, requires actions to minimize flood risks and impacts. Under this order, development alternatives must be considered and building requirements must be in accordance with specific federal, state, and local floodplain regulations.

3.2.2 Existing Conditions

3.2.2.1 Regional Setting

Groundwater

Aquifers which underlay Oklahoma County include both ephemeral (short-lived) and perennial (lasting the entire year) aquifers. The most important source of potable groundwater in the Oklahoma City metropolitan area is the Central Oklahoma Aquifer system. This aquifer extends under much of central Oklahoma and includes water in the Garber Sandstone and Wellington Formation, the overlying alluvium and terrace deposits, and the underlying Chase, Council Grove, and Admire Groups. The Garber Sandstone and the Wellington Formation portion of the Central Oklahoma Aquifer system is referred to commonly as the "Garber-Wellington Aquifer" and is considered to be a single aquifer because these units were deposited under similar conditions. Many of the best producing water wells are completed in this zone. On a regional scale, the aquifer is confined above by the less permeable Hennessey Group and below by the Late Pennsylvanian Vanoss Group. The regional dip of these formations is generally to the west (Parkhurst et al. 1993).

Tinker AFB lies within the recharge area of the Garber-Wellington Aquifer. The direction of the regional water table gradient under Tinker AFB is reported to range generally from west/northwest to southwest, depending on location, and has a magnitude ranging from 10 to 30 feet per mile (Christenson et al. 1992). However, determination of horizontal gradients is made difficult by the presence of a downward component of flow in the Garber-Wellington Aquifer. Both direction and magnitude of groundwater flow can be highly variable, both spatially and temporally, due to local variations in geology, sources of recharge, and the interaction between the shallow aquifer and streams. This aquifer is recharged primarily by infiltration of rainfall or surface water through fractures in the Fairmont Shale and directly into the Garber Sandstone (Oklahoma Water Resources Board [OWRB] 2006).

The depth to groundwater ranges from a few feet to about 70 feet below ground surface (bgs) depending on local topography. Across the county, water can sometimes be found in shallow, thin, discontinuous perched zones located above the aquifer. Most water from the Garber-Wellington aquifer is of sufficient quality to be used for most industrial, agricultural, and domestic purposes. However, some contaminated groundwater plumes do exist, typically at a depth of 175 feet or shallower. This does not pose health concerns at this time since the producing zone (i.e., depth at which water from supply wells is obtained) is 200 feet or deeper. Also, there appears to be an aquitard at approximately 200 feet which hydraulically separates the producing zone from shallower groundwater in the aquifer (Tinker AFB 2001).

At present, Tinker AFB derives most of its water supply from this aquifer and supplements this supply by purchases from the Oklahoma City Water Department. Industrial operations, individual homes, farm irrigation, and small communities not served by a municipal distribution system also depend on the Garber Wellington Aquifer. Communities presently depending on surface supplies, such as Oklahoma City, Midwest City, and Del City, maintain wells tapping the Garber-Wellington Aquifer as a backup water supply in the event of drought.

Wetlands

Wetlands represent approximately 2 percent of the land area in Oklahoma (USEPA 2006). Several wetlands are located in Oklahoma County; National Wetland Inventory (NWI) maps for the area indicate that these wetlands are primarily freshwater emergent, freshwater forested/shrub, freshwater pond, and riverine (US Fish and Wildlife Service [USFWS] 2006a).

Floodplains

Flood hazard areas of Oklahoma County are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect public health, safety, and general welfare. The bulk of Federal Emergency Management Agency (FEMA) designated floodplains, 100-year and 500-year, for Oklahoma County exist along the North Canadian River and its major tributaries. However, no FEMA-designated floodplains exist along the smaller, intermittent streams (OWRB 2006).

The Floodplain Board of Oklahoma County appoints a County Floodplain manager who administers and implements regulations and other appropriate sections of 44 CFR (National Flood Insurance Program Regulations) pertaining to floodplain management. The duties and responsibilities of the floodplain board are to adopt, administer, and enforce floodplain management regulations which: (a) Delineate floodplains and floodways, and delineate 100-year flood elevations within all unincorporated areas of the County (these delineations shall be submitted to the OWRB); (b) Preserve the capacity of the floodplain to carry and discharge regional floods; (c) Minimize flood hazards; and (d) Regulate the use of land in the floodplain (OWRB 2006).

Surface Water

Oklahoma County's landforms drain into the North Canadian River. The northern portion of the County drains into the Crutcho Creek Drainage Basin and into the North Canadian River, and the southern portion drains into the Elm Creek and Hog Creek Drainage Basins and into the South Canadian River, both of which are headwaters for the Arkansas-Mississippi River Basin. The North Canadian River runs west to east through Oklahoma County. The entire County is part of the Arkansas River Basin (USFWS 2006a).

Several drainage corridors traverse Oklahoma County close to Tinker AFB, including Brock Creek, East Elm Creek, Crutcho Creek, West Hog Creek, East and West Forks of Wildhorse Creek, Bluff Creek, Walnut Creek, and Soldier Creek. Surface waters occur in three main stream systems, one which drains to the north (Crutcho Creek with Kuhlman and Soldier Creek tributaries) and two to the south (East Elm Creek and West Hog Creek). The north-flowing stream system originates approximately 2 miles south of Tinker AFB's current southern boundary with on-base portions of the system comprising 12 smaller, first-order tributaries; two larger, second-order tributaries; and one main, third-order tributary. The south-flowing systems consist of only first- and second-order tributaries with higher-order tributaries located off base land. Several other minor creeks and draws feed into the above-mentioned major creeks (OWRB 2006).

3.2.2.2 Tinker AFB and Proposed Project Location

Groundwater

The direction of groundwater flow under Tinker AFB varies. There is an apparent groundwater divide associated with Crutcho Creek that affects groundwater flow direction. Regional topographic lows draw portions of groundwater in the area southwestward, while other areas flow northward toward discharge points along Crutcho Creek (Tinker AFB 2001).

Throughout much of the northern half of the base, the Garber-Wellington aquifer is not protected by any confining shale. In the southern half of the base, the Hennessey Group overlies the aquifer and acts as a confining layer because it is typical clay-rich, low-permeability shale. The confining nature of the Hennessey Group causes rainfall to remain near ground surface and flow

laterally until it discharges to streams. The groundwater system at Tinker AFB has been divided into five hydrogeologic zones: the Hennessey Water Bearing Zone, the Upper Saturated Zone (USZ), the Lower Saturated Zone (LSZ), the Lower-Lower Saturated Zone (LLSZ), and the Production Zone (PZ). The USZ and LSZ are regionally considered to be in the upper third of the Garber-Wellington aquifer, and generally are present at depths of less than 200 feet bgs. The LLSZ is considered the lower half of the LSZ. The PZ generally is considered to be greater than 200 feet bgs, and is used for water supply at Tinker AFB and off-base locations (Tinker AFB 2001). Tinker AFB is located in a recharge area for these water-bearing zones; groundwater is derived primarily from precipitation and from infiltration of surface streams.

Groundwater at Tinker AFB is found under either water table or confined conditions. The depth to water ranges from a few feet to about 70 feet bgs depending on the local topography. Across Tinker AFB, water can sometimes be found in shallow, thin, discontinuous perched zones located above the aquifer.

The approximate direction of groundwater flow in the Garber-Wellington aquifer is south and southwest across the southern half of the base and west to northwest across the northern half. Shallow groundwater may discharge to surface streams (gaining stream) or be recharged by streams (losing stream) (OWRB 2006). Both situations occur at Tinker AFB along Crutcho Creek and Soldier Creek. In contrast, water in the Hennessey Water Bearing Zone generally flows to the northeast toward Crutcho Creek from higher topographic areas along the south boundary of the base (Tinker AFB 2002a).

Wetlands

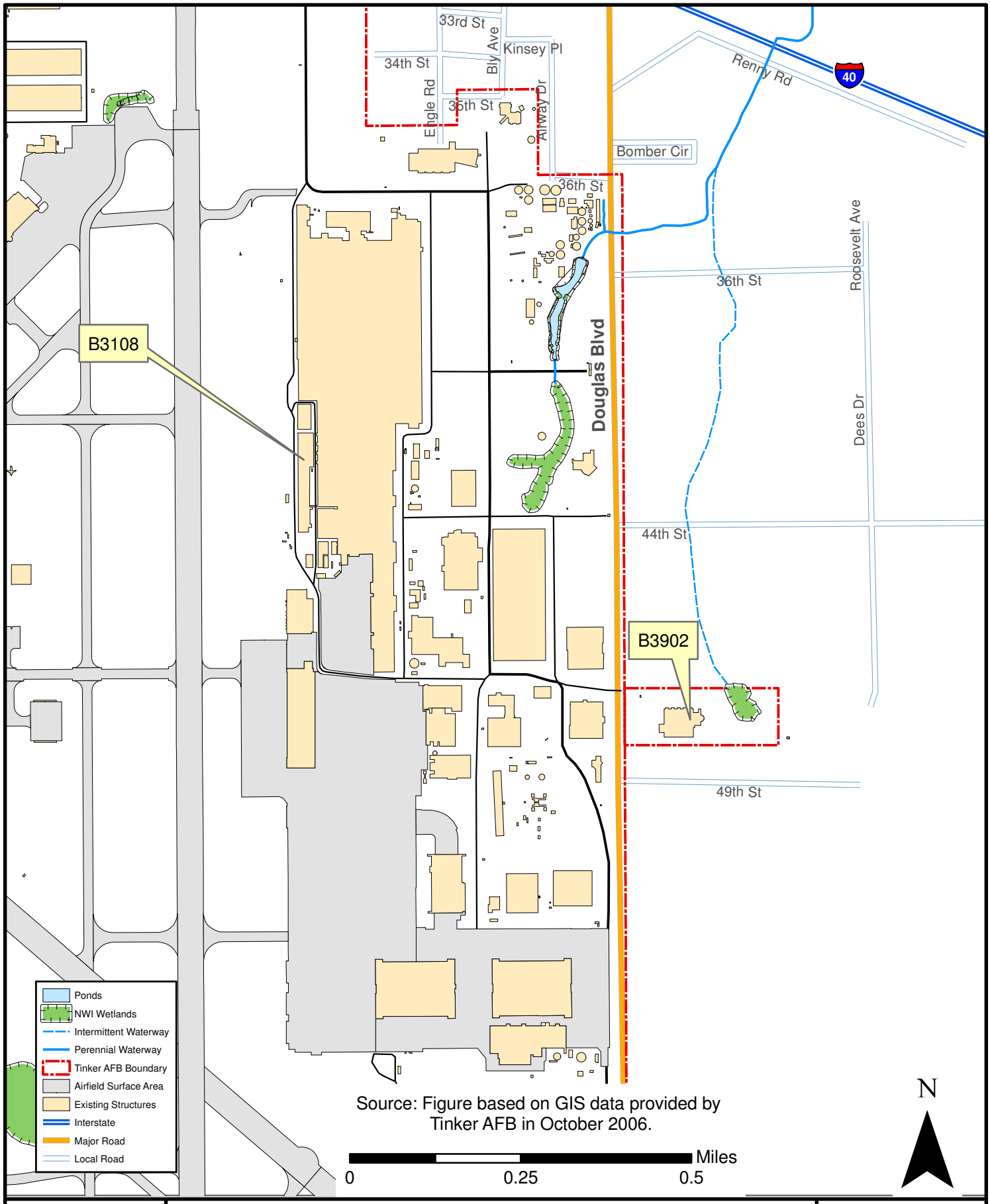
In 1995, approximately 65 acres of wetlands were identified on Tinker AFB by USFWS using NWI criteria; these wetlands included creeks, ponds, drainage swales, and other wet areas. Of the 65 acres, 7.9 acres were later classified by the USACE as jurisdictional wetlands under the CWA. The 7.9 acres were divided among five wetland areas: Ground Water Treatment Plant (GWTP) wetland (0.5 acres); Fuel Control Facility wetland (0.8 acres); Greenway wetland (4.8 acres); Compressed Natural Gas (CNG) wetland (0.3 acres); and the Glenwood wetland (1.5 acres, on-base portion only). This excluded the off-base portion (8.5 acres) of the Glenwood wetland which was located immediately adjacent to and east of the base on county and private land (Tinker AFB 2007a). In 2002, these 65 acres (73 individual wetland areas) were reassessed to track their status and trend (Wetland Study Report for Tinker AFB, Oklahoma, May 2003). Based on the survey, only two wetlands (i.e., Greenway and Prairie Pond) were classified as high quality wetlands. Thirty-four were classified as intermediate quality, and six as low quality. This study also determined that 31 of the original 73 NWI wetland areas no longer existed or were actually drainage ditches or wet-weather conveyances that did not function as wetlands or aquatic habitat and therefore were not included in the survey. These non-wetland areas covered approximately 27 acres and most were within the airfield or other highly industrialized areas of the base. Therefore, the current total NWI acreage on Tinker is estimated at 38 acres. These have not been officially "delisted" as wetlands by the USFWS who conducted the original study (Tinker AFB 2007a).

In 1999, the Glenwood wetland was drained because it attracted waterfowl which presented a bird/wildlife-aircraft strike hazard (BASH). This reduced the total on-base wetland acreage to 6.4 acres. Mitigation for the Glenwood wetland removal included the construction of wetlands in the cities of Choctaw (two wetlands totaling 2.3 acres) and McCloud (3 acres), Oklahoma; Eagle Ridge Institute in Oklahoma City (3 acres); and at the Kids-We-Care site (three wetlands totaling 10 acres) south of Guthrie, Oklahoma (mitigation acreages are approximated [Tinker AFB 2007a]).

All jurisdictional wetlands on Tinker AFB were man-made with the exception of the Glenwood wetland, which was created by beaver activity. The GWTP wetland is located on a Superfund site and therefore is regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) by the USEPA. The vegetation and soils of the GWTP wetland were removed in 1999 as part of a Soldier Creek remediation effort (Tinker AFB 2005a).

One 0.83-acre wetland is located at the proposed Consolidated Fuel Overhaul and Repair Facility site (Figure 3-1). Located within an intermittent south/north drainage channel, the wetland is likely the result of outfall from the NPDES permit #0000809 from south of the wetland and previous construction-related activities, namely the stockpiling of soil which inadvertently created an earthen dam that constricted drainage and created ponding at the site. Subsequent ponding enabled the succession from upland vegetation to more hydrophytic species. A field survey conducted in August 1996 delineated the boundaries of the wetland and determined that it is within the jurisdiction of the USACE for protection under CWA (Tinker AFB 1997). The wetland provides wildlife habitat, although this function is limited by the lack of submergent and emergent vegetation in the ponds (Tinker AFB 2002c). Recent discussions and correspondence with USACE determined that the wetland was not within the jurisdiction of the USACE (Tinker AFB, 2007e and Appendix C). The wetland likely provides some flood control and water cleansing functions to East Soldier Creek as stormwater from nearby urbanized landscapes filters through the wetland prior to entering the Soldier Creek drainage. Vegetation and wildlife associated with this wetland are described in *Section 3.3*.

Although the habitat quality at this wetland has been degraded due to extensive soil erosion, several wildlife species typical of urban environments have been observed. Mammal species known to frequent the area include raccoon, rabbits, opossum, and various rodents. Bird species that have been observed include several common songbirds, red-tailed hawk (*Buteo jamaicensis*), common crow (*Corvus brachyhnchos*), bobwhite quail (*Colinus virginianus*), turkey vulture (*Cathartes aura*) and several woodpecker species. Aquatic invertebrates, such as dragonflies, and mosquitoes, inhabit the wetlands located at this site, but larger wildlife species, such as fish and amphibians, are rare or non-existent since water flow is limited to intermittent storm events. Common waterfowl may use the wetland area for foraging and resting, but nesting is unlikely given the lack of vegetative cover and protection from predators. Deep-water habitat does not exist, thereby limiting foraging activities to dabbling duck species.



EA

Wetland and Waterbody Locations
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
3-1

Floodplains

In October 2002, USACE, Southwestern Division-Tulsa District, completed a study for Tinker AFB to update the 100-year and 500-year floodplains. The 100-year and 500-year floodplains were reassessed for the Middle Branch, Upper Crutcho Creek (the Eastern Branch), and Upper Crutcho Creek (Western Branch) (USACE 2002). Crutcho Creek and its tributaries and Kuhlman Creek are bounded by 100-year and 500-year floodplains designated by the FEMA. These floodplains affect approximately 520 acres of base land (Tinker AFB, 2007d). The bulk of these floodplains are located along Crutcho Creek. However, no FEMA-designated floodplains exist along the smaller, intermittent streams that exist on the base (USACE 2002). No 100- or 500-year floodplains have been designated on the proposed project site (Figure 3-2).

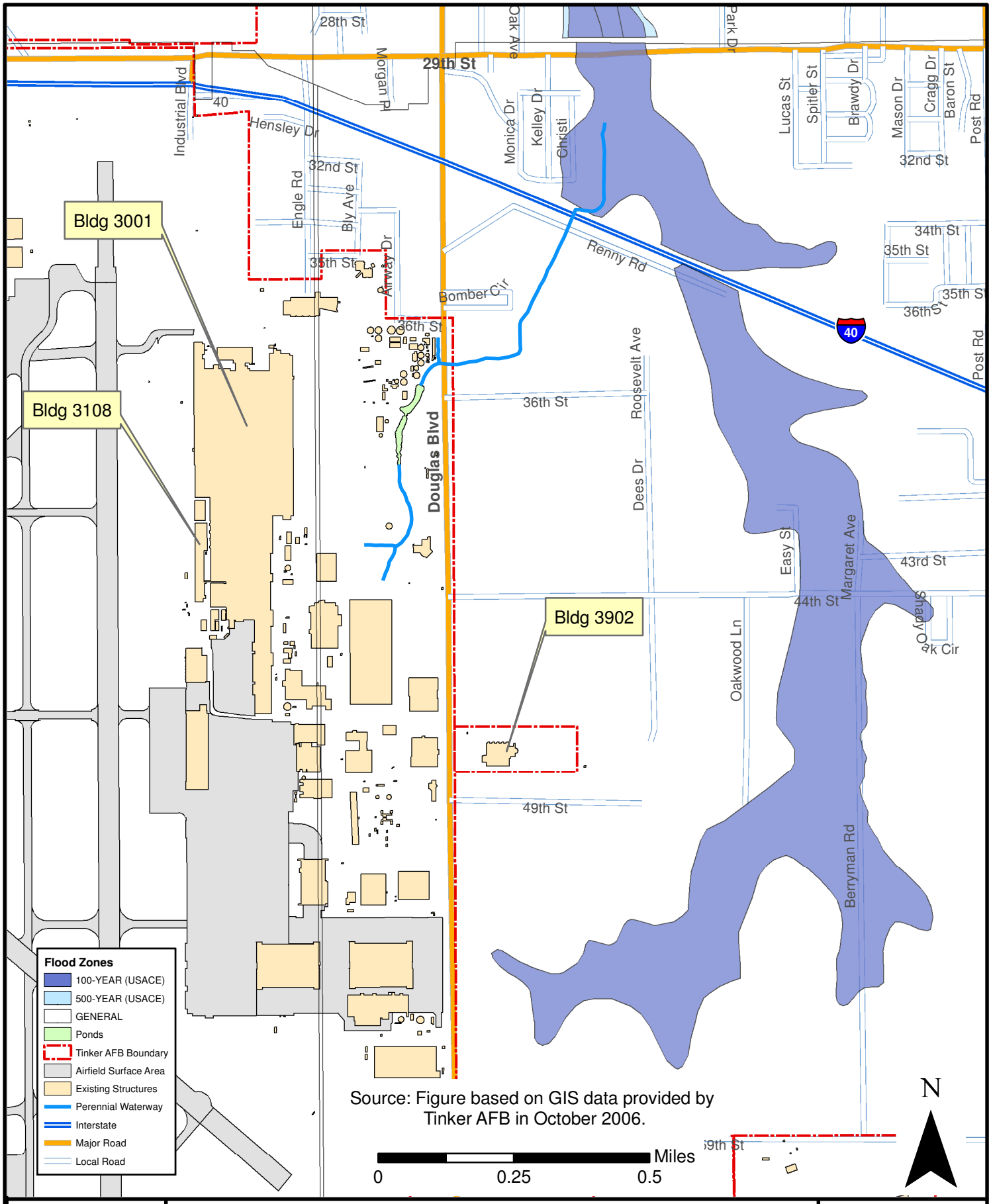
Regarding floodplain functions, the overall general status of Tinker AFB's 100-year floodplain is poor. However, the trend is upward because of conversion of some floodplain improved and semi-improved grounds to natural areas in recent years. Although no specific monitoring of floodplain functions has been accomplished in the past; projects are scheduled to provide the foundational data for measuring progress towards development of a healthy floodplain on Tinker AFB (Tinker AFB 2007a).

Surface Water

Surface drainage at Tinker AFB occurs in three primary drainage basins: 1) Crutcho Creek Drainage Basin, 2) Elm Creek Drainage Basin, and 3) Hog Creek Drainage Basin. These are further divided into 10 sub-basins or watersheds. The majority of land associated with Tinker AFB is drained by the Crutcho Creek Drainage Basin which flows to the north into the North Canadian River. The Elm Creek and Hog Creek Drainage Basins flow to the south of the base into the Little River which forms confluences with the South Canadian River (Tinker AFB, 2007a).

On-base, open-flowing waters comprise a total of about eight linear miles. The first- and second-order segments are typically ephemeral or intermittent while the third-order segment is perennial. All base creek flows are the result of stormwater runoff (Tinker AFB 2007a). Stormwater runoff is collected by various diversion structures and outfalls and then discharged to surface streams (Figure 3-3). Approximately 5 miles of stream channels within Tinker AFB lie within 100-year floodplains (USAF 1991).

No significant point source industrial discharges currently are made to any waterway on Tinker AFB. In 1996, the base Industrial Wastewater Treatment Plant (IWTP) and Sanitary Treatment Plant (STP) discharges were rerouted to the Oklahoma City Public Owned Treatment Works. This eliminated flows of 1.3 million gallons per day to the on-base portion of Soldier Creek (i.e., East Soldier Creek) at National Pollutant Discharge Elimination System (NPDES) Outfalls 001 and 01S (Tinker AFB 2007a).



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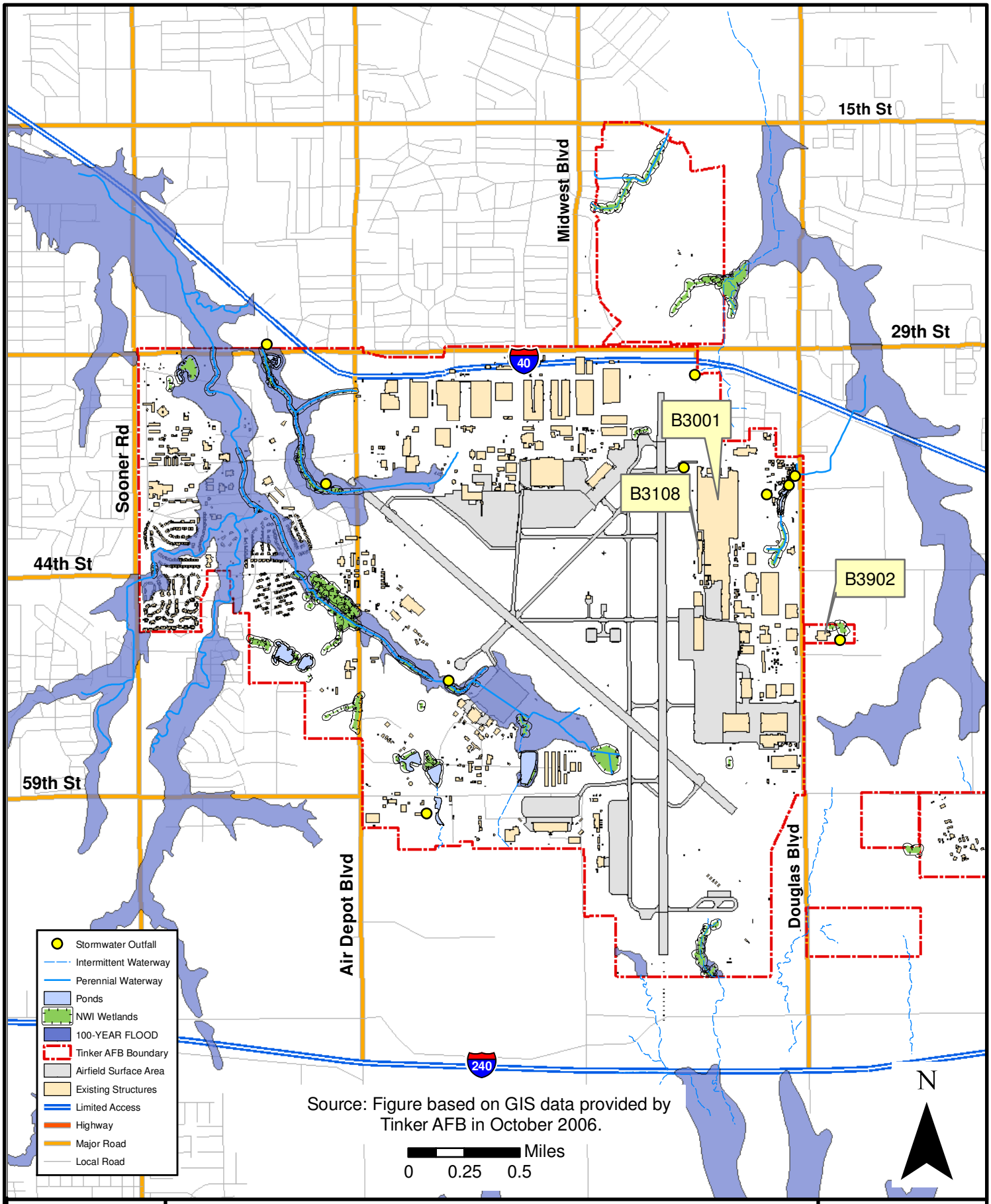
Floodplain Map
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
3-2



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Main Surface Water Features
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
3-3

The site proposed for the Consolidated Fuel Overhaul and Repair Facility lies in the upper reach of an intermittent branch of East Soldier Creek. This intermittent branch flows north into East Soldier Creek. The area of the watershed south of this site, estimated from a 7.5 minute US Geological Survey topographic map, is about 35 acres.

3.3 Biological Resources

3.3.1 Definition of Resources

Biological resources include native or naturalized plants and animals and the habitats in which they occur. Sensitive biological resources are defined as those plant and animal species listed as threatened or endangered, candidate, rare, and other sensitive flora and fauna, or proposed as such, by the USFWS and respective State agencies. Federal and State Species of Concern are not protected by law; however, these species could become listed or protected at any time if not properly managed. Threatened and endangered species are federally protected plants and animals that are in danger of becoming extinct without protection. These species may be rare because of specialized habitat needs or habitat destruction. The ESA of 1973 protects listed species against killing, harming, harassment, or any action that may damage their habitat.

3.3.2 Existing Conditions

3.3.2.1 Regional Setting

The landscape of Oklahoma County is characterized by level to gently rolling hills, broad flat plains, and bottomlands intersected by small to medium sized watercourses. The County is part of the Cross Timbers Vegetation Area of the Midwest and the Central Oklahoma/Texas Plains or Central Great Plains (Tinker AFB 2001).

Vegetation

The original vegetation cover in the central Oklahoma uplands consisted of mixed forests and woodlands interspersed with areas of open grasslands. These original plant communities have been radically altered through development, deforestation, intensive agriculture, and the introduction of invasive species (Tinker AFB 2001). However, many smaller portions of these vegetative communities still comprise Oklahoma County's vegetation. Upland forests integrating with woodlands and prairie comprise Oklahoma County's primary vegetation community. Intermixed in this community are woodlands of oaks, upland forests of deciduous or evergreen trees, and grasslands intermixed with blue grama (*Bouteloua gracilis*), buffalo grass (*Bouteloua dactyloides*), and non-native grasses (Hoagland 1999). The County's vegetative community also includes riparian areas adjacent to streams, drainage channels, and in low-lying areas where water availability is relatively greater than the surrounding landscape (Tinker AFB 2002a).

Much of the native vegetative communities associated within Oklahoma City and the Tinker AFB area has been replaced with developed landscape and ornamental and non-native vegetation (University of Oklahoma [OU] 2006).

Wildlife

Approximately 350 native vertebrate species and a much greater unknown number of invertebrates have historically occurred either in the Central Oklahoma/Texas Plains or Central Great Plains Ecoregions (Oklahoma Department of Wildlife Conservation [ODWC] 2007). Some species which probably occurred on this land during pre-settlement times include prairie dogs, bear, bison, wolves, elk, and horses. Numerous other species have been displaced by urban and industrial activities on and around Tinker AFB.

Five species are federally listed as threatened or endangered in Oklahoma County by the USFWS (Table 3-1). The State of Oklahoma has an endangered species act for plants and animals; species listed on the Federal list correspond with those on the State list (Oklahoma Natural Heritage Inventory [ONHI] 2003).

Table 3-1. Special Status Plant and Animal Species of Oklahoma County

Scientific Name	Common Name	State Status[1]	Federal Status[1]
Birds			
Haliaeetus leucocephalus	Bald Eagle	T	D
Vireo atricapillus	Black-Capped Vireo	E	E
Sterna antillarum	Least Tern	E	E
Charadrius melodus	Piping Plover	T	T
Grus americana	Whooping Crane	E	E
Tyto alba	Barn Owl	CS, SS2	
Buteo swainsoni	Swainson's Hawk	SS2	
Athene cunicularia	Burrowing Owl	SS2	
Lanius ludovicianus migrans	Migrant Loggerhead Shrike	SS2	
Fish			
Notropis girardi	Arkansas River Shiner	T	T
Mammals			
Marmota monax	Woodchuck	SS2	
Reptiles			
Phrynosoma cornutum	Texas Horned Lizard	SS2	
Plants			
Penstemon oklahomensis	Oklahoma Penstemon	S3	

[1]Legal Status:

- E – Endangered
- T – Threatened
- D – Delisted 28 June 2007.
- CS – Statewide closed season (state ranking). It is unlawful at any time to possess or to kill individuals of these species or to remove any individuals of these species from their natural habitats.
- SS2 - Species of Special Concern (state ranking). These species have been identified by technical experts as possibly threatened of extirpation but for which additional information is needed.
- S3 - Rare and local in Oklahoma (though it may be abundant at some of its locations); in the range of 21-100 occurrences.

Sources: USFWS 2007; Tinker AFB 2007.

3.3.2.2 Tinker AFB and Proposed Project Location

Vegetation

The area now occupied by Tinker AFB was historically dominated by tall and/or mixed grass prairie (Tinker AFB 2007a). Less than 2 percent of the pre-settlement prairie ecosystem currently remains on Tinker AFB. No pristine native prairie or bottomland areas are present on the installation. Only a few small, fragmented prairie remnants, less than 100 acres total, remain, and these are in degraded condition. Much of the original prairie was farmed as evidenced by remaining terraces at numerous locations on the base (Tinker AFB 2002a). Approximately half (2,620 acres) of the Tinker AFB land area has been developed for buildings, roads, pavement, railroads, and other structures. About 20 percent of the current land area (1,036 acres) is periodically maintained grounds (i.e., semi-improved grounds) such as the airfield. Approximately 14 percent of the land (700 acres) is highly maintained grounds (i.e., improved grounds) such as lawns, athletic fields, and a golf course. The remaining 14 percent (684 acres) is not maintained (i.e., unimproved grounds), and includes areas such as the Urban Greenway and Glenwood areas (Tinker AFB 2001). Seven vegetation types (including 31 vegetation communities with in those vegetation types) are found at Tinker AFB (Tinker AFB 2007a):

- Grassland – Characteristic of a native mid-grass prairie;
- Field – Successional stage of native and/or exotic species of grasses and forbs;
- Forest/Woodland – Close stand (forest) or open growth (woodland) in a natural area;
- Transitional Forest/Woodland – Successional stage of native and/or exotic trees configured in a close (forest) or open (woodland) stand, primarily in previously disturbed areas;
- Urban/Industrial – Dominated by turf grass, associated forbs, and ornamental herbaceous and woody plants;
- Transitional Urban/Industrial – Indigenous and exotic plants with a predominance of ornamental vegetation; and
- Wetland/Marsh – Dominated by mesophytes (plants growing under medium moisture conditions) and/or hydrophytes (plants growing under high moisture conditions) and located in areas temporarily or permanently inundated.

Within the areas that have been converted to urban and industrial use, the plant community comprises primarily of turf grasses and ornamental trees and shrubs. The predominant turfgrass on Tinker AFB is Bermuda grass. Native buffalo grass is often found mixed with Bermuda grass. Other more rural areas are typically a mixture of exotic and native plants. Trees and shrubs are composed of native and exotic plants, and, contrary to pre-settlement plant distribution, many woody plants are found on upland as well as bottomland sites (Tinker AFB 2001).

At the proposed project location, approximately half of the area is dominated by field, which includes Canada wild rye (*Elymus canadensis*), purple lovegrass (*Eragrostis spectabilis*), and knotroot bristlegrass (*Setaria geniculata*) (Tinker AFB 1997). A significant portion of the site is forested and is dominated by slippery elm (*Ulmus rubra*), hackberry (*Celtis occidentalis*), and sugarberry (*Celtis laevigata*), and, to a lesser extent, black willow (*Salix nigra*). Shrubs in the forested area include blackberry (*Rubus* sp.) and buckbrush (*Symphoricapos orbiculatus*). Poison ivy (*Toxicodendron radicans*) is also abundant, predominantly along the border between the forested area and the field. The 0.83-acre jurisdictional wetland, largely comprising two ponds, exists within the forested area (Tinker AFB 1997). Emergent vegetation in these ponds is limited to one patch of spike rush (*Eleocharis* sp.) in the upstream portion of the lower pond. Dominant tree species in and adjacent to the wetland are the same as listed above for the forested area with a greater proportion of black willow than in other areas. Because this area was not a wetland prior to the addition of a dam, a large proportion of the flooded trees consist of snags (dead or dying trees).

Wildlife

Wildlife at the site proposed for the Consolidated Fuel Overhaul and Repair Facility is limited to those species adapted to high levels of human activity and disturbance. Tinker AFB is classified as a Category 1 installation, as defined in AFI 32-7064, meaning that suitable habitat for conserving and managing fish and wildlife exists (Tinker AFB 2007a). The available habitat includes movement corridors (e.g., riparian zones along creeks) and pockets of undeveloped acreage surrounded by urbanized land (USAF 1991). The results of a 1990 reconnaissance survey indicated that approximately 1,800 acres were suitable or potentially suitable as wildlife habitat (USAF 1991). Included in this estimate were approximately 400 improved acres (military family housing and golf course), 600 semi-improved acres (mostly airdrome), and 800 unimproved acres.

Common mammalian species found on Tinker AFB include fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), beaver (*Castor canadensis*), coyote (*Canis latrans*), raccoon (*procyon lotor*), striped skunk (*Mephitis mephitis*), deer mouse (*Peromyscus maniculatus*), hispid cotton rat (*Sigmodon hispidus*), black-tailed jackrabbit (*Lepus californiscus*), and opossum (*Didelphis virginianus*) (USACE, 1995; USAF, 2001). Resident bird species include mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), red-winged blackbird (*Agelaius phoeniceus*), meadowlark (*Sturnella spp*.), scissor-tailed flycatcher (*Tyrannus forficatus*), great-horned owl (*Bubo virginianus*), and bobwhite quail (*Colinus virginianus*). Several reptile and amphibian species are commonly found at Tinker AFB. These include Texas horned lizard (*Phrynosoma cornutum*), ringneck snake (*Diadophis punctatus*), three-toed box turtle (*Terrapene caolina*), and bullfrog (*Rana catesbeiana*). The results of fish surveys at Tinker AFB indicate that 23 species of fish occur on base. Five species occur in ponds on the base while 18 species of fish occur in those portions of Crutcho, Kuhlman, and Soldier Creeks that are located on Tinker AFB (Tinker AFB 2002a). Some ponds on the facility have been stocked with fish including

catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and fathead minnows (*Pimephales promelas*).

The location proposed for the Consolidated Fuel Overhaul and Repair Facility consists of three general habitat types: field, forest/woodland, and wetland/marsh. The field likely provides habitat for species typical of grasslands that can also tolerate disturbed urbanized habitats, such as deer mouse, cottontail, and meadowlark. The forested portion likely provides habitat for a variety of common mammals such as raccoon, deer mouse, and fox squirrel. This forested area likely provides habitat for numerous species of songbirds, both resident and migratory. The 0.83-acre wetland likely attracts wading birds and waterfowl. No fish are known to exist in the ponds and very little emergent or submergent vegetation is present. Frogs and turtles likely occur in these ponds.

A Habitat Evaluation Procedure (HEP) was conducted on the wetland at the proposed project site in July 2002 to quantify available habitat values for three wildlife species that represent wildlife use of the wetland habitat (Tinker AFB 2002). The three species selected for the HEP were slider turtle (*Pseudemys scripta*), bullfrog (*Rana catesbeiana*), and great blue heron (*Ardea herodias*). This analysis used published Habitat Suitability Index (HSI) models, which summarize habitat requirements of individual species into a model that produces a habitat quality index value between the lowest value of 0.0 and the highest of 1.0. The indices are then multiplied by acres to calculate habitat units (HUs) for each species. The following HUs were calculated as existing in the wetland: 0.17 for the slider turtle, 0.56 for the bullfrog, and 0.00 for the great blue heron.

Wildlife observed during the HEP fieldwork include the little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), American crow (*Corvus brachyrhynchos*), great-tailed grackle (*Cassidix mexicanus*), northern cardinal (*Cardinalis cardinalis*), great-crested flycatcher (*Myiarchus crinitus*), Blanchard's cricket frog (*Acris crepitans*), and evidence of raccoon (Tinker AFB 2002).

Threatened and Endangered Species

Field surveys were conducted at Tinker AFB during 1993 and 1994 to identify federally listed endangered or threatened species (USACE 1995) or state designated sensitive species (Johnson et al. 1995). No Federal or state-listed threatened or endangered species were found during this survey or documented on other occasions on Tinker AFB (USACE 1995; Tinker AFB 2007a). However, the Oklahoma penstemon (*Penstemon oklahomensis*), which is classified as rare under the ONHI, has been documented at numerous locations on Tinker AFB (Tinker AFB 2007a). The ONHI lists the species as G3S3 (restricted range) (ONHI 2003).

Two federally listed species are known to be seasonal residents of the local area, the bald eagle (*Halieaeetus leucocephalus*) and the whooping crane (*Grus americana*). The nearest known sightings of the bald eagle are around Lake Arcadia and Lake Thunderbird (approximately

9 miles and 22 miles from Tinker AFB, respectively). It is unlikely these species would forage along creeks and open areas adjacent to the proposed project site, as these habitats are generally urban and of poor quality for the subject species (Tinker AFB 2002a). Base-wide surveys for the black-capped vireo (*Vireo atricapilla*) were conducted in 1993 and 1994, and none was sighted during these surveys (Tinker AFB 2002a).

Three state special concern species were found on the facility during this survey. These include Texas horned lizard (*Phrynosoma cornutum*), barn owl (*Tyto alba*), and loggerhead shrike (*Lanius ludovicianus*). It is not known whether the loggerhead shrikes observed were the migrant race (*migrans*). Burrowing owl (*Athene cunicularia*) and Swainson's hawk (*Buteo swainsoni*), both state species of special concern, have also been documented on the facility (Tinker AFB 2007a). The USFWS defines species of concern for the future well-being of the species, but the species does not receive any protection under the ESA. AFI 32-7064, *Integrated Natural Resources Management*, states that species having such a status should be considered in future planning and facility siting as well as provided protection wherever possible. The state special concern species identified at Tinker AFB are discussed below.

Texas Horned Lizard

Texas Horned Lizards range from the South-Central U.S. to Northern Mexico (Texas Parks and Wildlife [TPW] 2000). They occur in arid and semiarid habitats in open areas with sparse to slightly more dense plant cover with corridors of sparse vegetation, in Oklahoma, and they primarily eat ants. The species has been documented in sparsely vegetated grassland areas in the southwest corner of Tinker AFB with isolated observations in the southeast and northern areas of the base (Tinker AFB 2007a). Sparsely vegetated areas within the proposed project site are quite limited. The species could possibly, but not likely, occur in these areas and was not observed to be present during the 2002 field study.

Barn Owl

The barn owl is found throughout most of the U.S. and is a rare resident of most of Oklahoma. It usually occupies relatively open areas, such as prairies, meadows, and marshes. The barn owl nests and roosts in buildings, cliffs, and trees. The diet of the owl consists primarily of rodents or small birds, and occasionally insects (Oberholser 1974). Barn owls have been observed in northeastern portions of Tinker AFB in the Glenwood area (USAF 1991). No nests were observed during fieldwork for the HEP at the proposed project site. It is possible that barn owls could forage for rodents in the fields adjacent to the wetland.

Swainson's Hawk

Swainson's hawk occurs throughout the facility on relatively open lands and has historically nested along Kuhlman Creek south of the golf course (Tinker AFB 2007a). No hawk nests were observed at the proposed project site during the HEP fieldwork. Swainson's hawk could potentially forage over the fields adjacent to the wetland, but have not been observed there.

Burrowing Owl

Burrowing owls inhabit grasslands and are frequently associated with prairie dog colonies. They have been observed on the airfield and in Reserve 3 of the Urban Greenway in winter (Tinker AFB 2007a). The species is believed to be a winter visitor to Tinker AFB, and no nests have been documented. Burrowing Owls have not been observed on the proposed site; however, they could potentially, but not likely, use the fields on-site for foraging in winter.

Oklahoma Penstemon

This species is found only in Oklahoma but is very abundant at numerous locations within a portion of Oklahoma (ONHI 2003). It is found in prairies, oak savannas, abandoned fields, and along roadsides (Johnson et al. 1995). The penstemon is located in fragmented remnant native prairie communities, primarily in the southeast portion of the base to include the airfield, Engineering Installation Group (EIG), and Douglas Field. Other small populations occur in the northeastern portion of Glenwood and at the Fuel Control Facility (Tinker AFB 2007a) including a few plants (3 to 4) at the proposed project site (Tinker AFB 2002d).

All DoD installations are required to perform a threatened and endangered species survey prior to any activities that disturb habitat that potentially supports such species. However, there are no threatened or endangered species known to occur on or in the immediate vicinity of the proposed Consolidated Fuel Overhaul and Repair Facility site due to unsuitable habitat. Further, no designated critical habitat or wilderness areas are located on or in the immediate vicinity of the base (USFWS 2006b & 2006c). Further information summarizing special status species potentially found at the proposed project site is included in Table 3-2.

Table 3-2. Special Status Species Potentially Occurring on the Proposed Action Site

Scientific name Common Name	Status	Habitat Requirements	Habitat	Range	Presence at Proposed Location
Federal Listed Species					
Charadrius melodus (Piping plover)	T	Sand/gravel areas on lakes, river, and ponds	U	C	UN
Haliaeetus leucocephalus (Bald eagle)	D	Trees or cliffs near water; oceans, rivers or lakes	U	C	UN
Grus Americana (Whooping crane)	E	Marshes	U	Mi	UN
Sterna antillarum athalassos (Interior least tern)	E	Islands/sandbars in large rivers; sandy areas, shallow water	U	C	UN
State Special Concern Species					
Athene cunicularia (Burrowing owl)	SS2	Grasslands, prairie dog colonies	M	C	PO
Buteo swainsoni (Swainson's hawk)	SS2	Plains, range, open hills, sparse trees	M	C	PO

Table 3-2. Special Status Species Potentially Occurring on the Proposed Action and Alternative 1 Site (Cont.)

Scientific name Common Name	Status	Habitat Requirements	Habitat	Range	Presence at Proposed Location
State Special Concern Species					
Lanius ludovicianus migrans[1] (Migrant loggerhead shrike)	SS2 SC	Open country with scattered trees, scrub, deserts, roadsides	S	C	PO
Phrynosoma cornutum (Texas horned lizard)	CS SS2 SC	Semi-arid open country with sparse plant growth	M	C	PO
Tyto alba (Barn owl)	SS2	Feeds in grasslands; nests in caves, trees, and buildings	S	C	PO
OK Natural Heritage Inventory					
Penstemon oklahomensis Oklahoma penstemon	G3S3	Prairies, oak savannas, abandoned fields, and along roadsides	S	C	V

Sources: ODWC 2007; USAF 2001; Tinker AFB 2007a.

Key:

Status Codes*

E Federally and State Endangered
T Federally and State Threatened
D Federally Delisted on 28 June 2007
SC Federal Species of Concern (Former C2 Candidates, list no longer maintained by USFWS)
CS Statewide Closed Season
SS2 State Special Concern Category II
G3 Rare globally
S3 Rare and local in Oklahoma (may be locally abundant)

*Federally listed endangered or threatened species are automatically included on Oklahoma's state list in the same category

Habitat Codes		Range Codes		Presence Codes	
S	Suitable	H	Historic	UN	Unlikely
M	Marginal	C	Current	PO	Possible
U	Unsuitable	Mi	Migratory	V	Verified (in the immediate vicinity of proposed FCF)
		P	Periphery		

Notes:

[1]Loggerhead shrikes have been documented on Tinker AFB. It is unknown whether the migrant race occurs (Tinker AFB 2007a).

All species listed by USFWS 2002 as occurring in Oklahoma County were included in table.

State sensitive species include those species that have been documented on Tinker AFB according to Tinker AFB 2007a.

3.4 Transportation and Circulation

3.4.1 Definition of Resource

Transportation and circulation refer to the movement of vehicles throughout a road and highway network. Primary roads are principal arterials, such as major interstates, designed to move traffic and not necessarily to provide access to all adjacent areas. Secondary roads are arterials such as rural routes and major surface streets which provide access to residential and commercial areas, hospitals, and schools.

3.4.2 Existing Conditions

3.4.2.1 Regional and Local Circulation

Tinker AFB is located within the city limits of Oklahoma City, approximately 9 miles, by surface roads, southeast of downtown. Oklahoma City is served by a network of interstates and local and regional arterial roads. Four interstates, I-40, I-35, I-240, and I-44, pass through Oklahoma City and provide regional access to the base.

Three arterial roads, including Sooner Road, Southeast 29th Street, and Douglas Boulevard, and two interstates, I-40 and I-240, provide access to Tinker AFB. Sooner Road is a north-south, four-lane arterial that forms part of the western border of the base. Southeast 29th Street is an east-west arterial that – together with I-40 – forms the northern boundary of the base. Douglas Boulevard is a four-lane, north-south arterial that forms the eastern boundary of the base and provides access to the base through the Lancer Gate. I-40 runs along the northern boundary of the base and provides access to the base via Air Depot Boulevard/Tinker Gate and Eaker Gate. Interstate-240, an east-west arterial located south of the base, provides access to the base by Sooner Road, Air Depot Boulevard (Gott Gate), and Douglas Boulevard.

3.4.2.2 Circulation at Tinker AFB and at the Proposed Project Location

A network of arterial, collector, and local roads serves Tinker AFB. A system of one- and two-lane roads supports the majority of the traffic at the base. Air Depot Boulevard, East Drive, Arnold Street, and Patrol Road are the major arterial roads. A network of primarily two-lane collector roads provides access to facilities on the base and to the arterial network. McNarney Avenue, Reserve Road, and Mitchell Avenue are the primary collector roads.

Ten gates are located on the perimeter of Tinker AFB (Tinker AFB 2005a). The Eaker Gate (Gate #2) and Lancer Gate (Gate #20) are open 24 hours per day, 7 days per week. The remaining gates are open at various times to accommodate peak flow; these gates and their associated base access routes include the following:

- Eaker Gate (Gate #2), via Southeast 29th Street and F Avenue,
- Gott Gate (Gate #34), via Air Depot Boulevard,
- Vance Gate (Gate #40), via Sooner Road and Arnold Street,
- Hope Gate (38 EIG), via Southeast 59th Street,
- Turnbull Gate (Gate #3) at A Avenue and Southeast 29th Street,
- Hruskocy Gate (Gate #7), via Perimeter Road and Industrial Boulevard,
- Liberator Gate (Gate #21) Entrance Road A and Douglas Boulevard, and
- Marauder Gate (Gate #29) at Southeast 59th Street and Douglas Boulevard.

The proposed project site lies on a Tinker AFB-owned parcel which is located east of Douglas Boulevard and that currently contains B3902. This parcel is not physically adjacent to the base; rather it is separated from the main installation by Douglas Boulevard. Access is provided to the site via a driveway and security gatehouse. The intersection between the driveway and Douglas Boulevard is unsignaled.

The USAF has established guidelines (AFI 32-1084) intended to ensure that adequate parking is available at USAF installations; according to these standards, the ratio of available parking spaces to personnel should be no less than 38 percent of the largest shift of civilian employees.

3.5 Hazardous Materials and Wastes

3.5.1 Definition of Resource

Hazardous materials are defined as substances with strong physical properties of ignitability, corrosivity, reactivity, or toxicity which may cause an increase in mortality, a serious irreversible illness, incapacitating reversible illness, or pose a substantial threat to human health or the environment. Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes which pose a substantial present or potential hazard to human health or the environment.

Issues associated with hazardous materials and wastes typically center around underground storage tanks (USTs); aboveground storage tanks (ASTs); and the storage, transport, and use of pesticides, bulk fuel, and petroleum, oils, and lubricants (POLs). When such resources are improperly used they can threaten the health and well-being of wildlife species, botanical habitats, soil systems, water resources, and people.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, DoD has dictated that all facilities develop and implement *Hazardous Waste Management Plans* or *Spill Prevention and Response Plans*. Also, DoD has developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g., CERCLA and Resource Conservation and Recovery Act [RCRA]) effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

3.5.2 Existing Conditions

3.5.2.1 Hazardous Materials

A large amount of hazardous materials are utilized to perform the mission of Tinker AFB. The Hazardous Materials Management Program (HMMP) manages the procurement and use of hazardous materials at the base. The HMMP functions through the Hazardous Materials Pharmacy, which consists of a decentralized Hazardous Material Pharmacy Cell and a Hazardous

Materials electronic tracking system, the Hazardous Material Management System (HMMS). The HMMS database management system performs the following automated functions:

- Tracks training, exposure, inventory, and personal protective equipment.
- Dispenses hazardous materials according to units of use.
- Serves as central issue point for Just-In-Time control and issue.
- Creates on-line Material Safety Data Sheets (MSDS).
- Maintains hazardous materials control by authorized user, zone, and task.

The tracking system provides the data necessary to meet reporting requirements, assess processes for pollution prevention opportunities, and measure success in minimizing hazardous materials usage (Tinker AFB 2006b).

Tinker AFB's OC-ALC Plan 19-2 Spill Prevention and Emergency Response Plan for Hazardous and Extremely Hazardous Material and Spill Prevention Control and Countermeasures Plan (Tinker AFB 2004b) presents specific procedures for preparing for and responding to inadvertent discharges of oil or releases of hazardous substances at the base. In 2002, Tinker AFB developed the StormWater Pollution Prevention Plan (SWPPP) to comply with the conditions of the DEQ Multi-Sector General Permit (MSGP) for StormWater Discharges Associated with Industrial Activities (OKR05) and DEQ Phase II Small Municipal Separate Storm Sewer System (MS4) (OKR04) from the Draft February 2007 SWPPP for Tinker. The SWPPP is noted as a supporting plan in OC-ALC Plan 19-2. The SWPPP provides base-wide and facility-specific Best Management Practices (BMPs) to reduce pollutants in stormwater discharges from the base. The BMPs for Tinker AFB include:

- Source controls,
- Management practices,
- Preventive maintenance,
- Spill Prevention and response,
- Erosion and sediment controls, and
- Identification of stormwater pollution prevention personnel.

3.5.2.2 Hazardous Waste Generation and Accumulation

Tinker AFB is permitted under RCRA as a Large Quantity Generator (LQG) and a Treatment, Storage and Disposal Facility (TSDF) of hazardous waste. The RCRA permit (number OK 1571724391) was issued to Tinker AFB in August 2002 by DEQ, the primary oversight agency for RCRA compliance in Oklahoma (Tinker AFB 2006b). Hazardous wastes at the base are managed in accordance with the most recent Hazardous Waste Management Instruction guidelines (Tinker Air Force Base Instruction [TAFBI] 32-7004). Compliance with the

provisions, regulations, and mandates put forth in TAFBI 32-7004 is mandatory for actions relating to hazardous waste on the installation. The purpose of the guidelines is to ensure safe and effective collection, handling, and disposal of hazardous waste on the installation in a manner that complies with applicable DoD, Air Force, Federal, and State laws and regulations (Tinker AFB 2005a). Specific procedures for preparing for and responding to inadvertent discharges of oil or releases of hazardous substances at the base is provided in Tinker AFB's *Spill Prevention and Emergency Response Plan for Hazardous and Extremely Hazardous Material and Spill Prevention Control and Countermeasures Plan* (Tinker AFB 2004b).

The largest amount of hazardous waste at the base is generated by aircraft and jet engine maintenance and overhaul activities. These activities include:

- Preparation of aircraft skins and structural members,
- Paint removal and application, degreasing, metal etching and carbon removal of engines, and
- Abrasive blasting.

Conducting these activities requires the use of large amounts of solvents and the generation of dust and liquid wastes. Other hazardous wastes contributing to this waste stream includes petroleum products and waste, hydraulic fluid, and anti-freeze.

Another large hazardous waste stream generated at Tinker results from RCRA corrective actions on past-contaminated sites, and remediation of a National Priorities List (NPL) site on the base. These wastes consist of solvent, hydrocarbon, and metal-contaminated soil and debris removed during remediation projects.

According to the Environmental Compliance Assessment and Management Program (ECAMP) fiscal year (FY) 2006 Final Report for Tinker AFB, approximately 6000 containers of hazardous waste are generated at Tinker AFB each year excluding bulk roll-off and tanker trucks, industrial wastewater and environmental cleanups (Tinker AFB 2006b). These containers are tracked from the issue of an empty container through disposal of the container using the HMMS. A total of 659 hazardous waste collection areas (Initial Accumulation Points [IAPs]), further sub-categorized into Collection Points (CPs) and Waste Staging Areas (WSAs), are located throughout the base (Tinker AFB 2006b). Waste containers from the IAPs are brought to three centralized Accumulation Points (APs), which include Buildings 809 and 3125. Building 809 is the largest of the APs and processes the majority of containerized hazardous waste from the IAPs for transfer to the TSDF. The TSDF is located in Building 810 and is operated by the Defense Reutilization and Marketing Office (DRMO). The role of the TSDF is limited to conforming storage (Tinker AFB 2006b). Buildings 810 and 811 temporarily house hazardous waste for a period up to one year (Tinker AFB 2005a). Serialized accumulation containers for non-bulk hazardous waste are issued to waste generators and picked up when full (Tinker AFB 2006b). Profiling is completed using either generator knowledge or laboratory analysis to identify and

quantify the chemical constituents of the waste for proper treatment and disposal. Containers are then shipped offsite for disposal at least weekly under a 21-day lifecycle at the TSDF. Bulk shipments of hazardous wastewater, fuels, treatment sludge, process tank solutions and contaminated soils are shipped directly from the point of generation to an offsite disposal facility.

Table 3-3 summarizes the hazardous materials used/stored in B3001 and B3108. Waste from these buildings is brought to Building 809 for storage until transfer to the DRMO and final disposition off base. Wastes used/stored in B3001 and B3108 user's area would be relocated to the proposed facility. Currently, there are four 10,000 gallon underground storage tanks (UST) associated with B3108 and are located outside of the building. Two tanks are used for storage of calibration fluid and the other two are used for calibration fluid waste. These will be duplicated in the new project. There are no other storage tanks associated with the materials listed in Table 3-3.

Table 3-3. Hazardous Materials Used in B3001 and B3108

Location	Hazardous Materials Used	Usage
B3001	flux paste	12oz/quarter (qtr)
B3001	#125 flux	3 pts/qtr
B3001	red dykem	24oz/qtr
B3001	petrolatum	16lbs/qtr
B3001	isopropyl alcohol	43 gal/qtr
B3001	sealing compound	6 kits/month
B3001	3120 RTV silicone	24oz/qtr
B3001	dampning fluid	6lbs/qtr
B3001	all purpose cleaner	1100 oz/qtr
B3001	primer adhesive	3 pts/qtr
B3001	1010 oil	165 gal/qtr
B3001	tin/lead solder	3 lbs/qtr
B3001	silver goop	6 lbs/qtr
B3001	petroleum jelly	2lbs/qtr
B3001	PD-680	223 gal/qtr
B3001	calibration fluid	2 gal/qtr
B3001	layout dye	32oz/qtr
B3001	alodine	1 qt/qtr
B3001	sealant	12oz/qtr
B3001	sealant	72oz/qtr
B3001	primer	12oz/qtr
B3001	pipe sealant	12oz/qtr
B3001	sealant	12oz/qtr
B3001	primer	24oz/qtr
B3001	grease	12oz/qtr

Table 3-3. Hazardous Materials Used in B3001 and B3108 (Cont.)

Location	Hazardous Materials Used	Usage
B3001	resin coating	3lbs/qtr
B3001	lapping compound	300oz/qtr
B3001	oxalic acid	75oz/qtr
B3001	sodium hydroxide	300lbs/qtr
B3001	potassium permanganate	440lbs/qtr
B3001	nitrogen, high purity	3 cylinders/qtr
B3001	dykem, hi-spot blue	1oz/qtr
B3001	CEE-BEE J-84L	650 gal/year
B3001	alkaline rust remover	330 gal/year
B3001	alkaline permanganate	1200lbs/year
B3001	Beyond 2005 cleaner	250gal/year
B3001	glass cleaner	48oz/year
B3001	Fremont 776 cleaner	660gal/year
B3001	anti-seize lubricant	16oz/qtr
B3001	threadlocker 262	3oz/qtr
B3001	silicon sealant	30gal/qtr
B3001	hyd fluid	2pts/qtr
B3001	penetrating oil	1pt/qtr
B3001	Aerokroil	195oz/qtr
B3001	grease	1 gal/year
B3001	grease	12oz/qtr
B3001	lubricant	80oz/year
B3001	oil additive	160oz/qtr
B3001	grease	1lb/qtr
B3001	silicon compound	1oz/qtr
B3001	flux	1oz/qtr
B3001	epoxy adhesive	1oz/qtr
B3001	spray and wipe detergent	12pts/qtr
B3001	Add B	165gal/qtr
B3001	Add A	165gal/qtr
B3001	hotsy soap	300gal/qtr
B3108	acetone	12 cans/yr
B3108	talc powder	12 pounds/yr
B3108	isopropyl alcohol	48 gallons/yr
B3108	talc	48 bottles/yr
B3108	water additive mk-47	60 cans/yr
B3108	nitrogen, high purity	1280 litters/yr
B3108	nitrogen n_2 liquified	400 cubic feet/yr
B3108	calibration fluid	72,820 gallons/yr

Table 3-3. Hazardous Materials Used in B3001 and B3108 (Cont.)

Location	Hazardous Materials Used	Usage
B3108	leak test compound	72 bottles/yr
B3108	detergent (spray & wipe)	100 bottles/yr
B3108	detergent, general purpose	12 cases/yr
B3108	glass cleaner	12 cases/yr
B3108	sealant	96 tubes/yr
B3108	corrosion preventative	24 cans/yr
B3108	adhesive	12 boxes/yr
B3108	adhesive instabond s-100	12 boxes/yr
B3108	sealant mmm-a-122c	24 tubes/yr
B3108	molylube 503 grease	24 tubes/yr
B3108	hydraulic fluid brayco mil-h-560	100 gallons/yr
B3108	penetrating oil mil-w-p-216	24 pints/yr
B3108	assembly fluid	12 gallons/yr
B3108	hydraulic lubricating oil	6 each 55-gallon drums/yr
B3108	grease, molybdenum dislufide	24 cans/yr
B3108	lubricating oil mil-l-7808	6 each 55-gallon drums/yr
B3108	hydraulic fluid mil-prf-6083	6 each 55-gallon drums/yr
B3108	lubricant cleaner	200 pints/yr
B3108	oil additive	48 cans/yr
B3108	oil sch-624	24 cans/yr
B3108	oil, mobil shc 825	12 each 55-gallon drums/yr
B3108	oil turbo t oil 32	48 cans/yr
B3108	oil mobil velocite oil nunber 3	24 cans/yr

3.5.2.3 Fuel Storage

The fuels and materials stored and handled in bulk at the base include JP-5, JP-8 (aviation fuel), JP-10 (missile fuel), Mogas (automotive gasoline), PF-1, diesel fuel, biodiesel fuel, calibration fluid and de-icing fluid. Conoco supplies JP-8 fuel to Tinker AFB through a 6-inch supply line that enters the northern section of the base and continues to the main tank farm (Tinker AFB 2005a). Tanker trucks are used as a backup to deliver JP-8, which is dispensed to aircraft either from eleven R-11 refuelers or directly through hydrants on the aprons on the west, south, and east sides of the base. An estimated 54 percent of aircraft refueling is done through hydrants and the remaining 46 percent is by trucks. Approximately 50 percent of defueling is done by hydrants and approximately 50 percent is by trucks (Tinker AFB 2006b).

Various fuels at the base are also stored in ASTs and USTs. Releases from ASTs and USTs (i.e., spills, overfill, and leaks) can cause fires or explosions that threaten human safety and can contaminate soil and groundwater that threaten human health. The main goal of the base's storage tank program is to protect groundwater and soil from contamination by ensuring that:

- all ASTs meet all applicable requirements including requirements for leak testing and preventing, responding to, reporting, and cleaning up spills;
- new USTs (including piping) are designed and constructed to provide the following: corrosion protection, release detection, spill and overfill prevention, proper installation, and secondary containment; and
- all existing USTs (any regulated UST installed before 22 December 1988) are upgraded to meet the standards for new USTs (Tinker AFB 2005a).

An aggressive investigation of abandoned and active USTs at Tinker AFB began in September 1985. Eighty-eight active tanks and 38 abandoned tanks were identified and located. Most of those tanks were found in the vicinity of Building 3001 and in the north central portion of the base near B201, B210 and the B290 Fuel Farm.

As of July 31, 1999, 26 sites were established with the Oklahoma Corporation Commission (OCC) to investigate releases from USTs. Tinker AFB has completed the majority of the investigations for determining the nature and extent of contamination at each UST site; several of those sites are in active remediation. Currently, fifteen of the activated sites have been closed or deactivated in accordance with OCC regulations that were in effect prior to 1 September 1996. These previous rules used a system that categorized UST sites for remediation based on generic contaminant levels in soils and groundwater. On 1 July 1996, the OCC issued new rules that classify sites for remediation based on risk to human health and the environment. The process is referred to as the Oklahoma Risk-Based Corrective Action (ORBCA) Program. Eleven sites are still open and are in remediation or have been recommended for case closure. In addition, two UST removals were performed in 1998, and tank closure reports were submitted to the OCC in December 1998 for each site. According to the ECAMP FY 2006 Final Report, Tinker AFB currently maintains 36 active USTs and 90 active ASTs (Tinker AFB 2006b).

No USTs or ASTs are known to have been installed at the proposed project site.

3.5.2.4 Environmental Restoration Program

The Secretary of Defense established the Defense Installation Restoration Program (IRP) (present-day ERP) in 1981 to investigate and remediate hazardous waste sites at DoD facilities. The USAF subsequently established its IRP to locate and investigate hazardous waste sites on its installations. The IRP execution strategy is to protect human health and the environment, satisfy legal agreements and have all sites closed or remedies in place by the end of FY 2008 (Tinker AFB 2005a). Fully restored and remediated IRP sites present few constraints to future on-base development; however, the implementation of land use controls (LUCs) may be required. LUCs are physical, legal, or administrative mechanisms that restrict or limit access to contaminated property to promote beneficial land uses and to protect human health and the environment.

Tinker AFB began its IRP in 1980 with the completion of a Preliminary Assessment (PA) of 14 sites. Various base-wide surveys (i.e., underground storage tank and water quality surveys) identified other potential IRP sites and additional PAs were conducted for these sites. A total of 40 IRP sites including landfills, fire training pits, radioactive waste disposal sites, fuel storage areas, industrial waste pits, and the IWTP have been identified at Tinker AFB since the beginning of the IRP (Tinker AFB 2005a). A total of 23 of the IRP sites are addressed under RCRA guidance and four are addressed under CERCLA as operable units on the National Priorities List. Numerous remedial investigations/feasibility studies (RI/FS), RCRA facility investigations (RFI), corrective measure studies (CMS) and interim response actions have been conducted at various sites on the base. Seventeen of the 40 sites have been closed, and no further action is required.

No IRP or ERP sites are located in the vicinity of the proposed project site.

SECTION 4
ENVIRONMENTAL CONSEQUENCES

This section evaluates the potential environmental consequences resulting from implementation of the Proposed Action or alternatives. Analyses are presented by resource area, as presented in *Section 3, Affected Environment.*

4.1 Air Quality

4.1.1 Approach to Analysis

The 1990 Amendments to the CAA require that Federal agency activities conform to the SIP with respect to achieving and maintaining attainment of NAAQS and addressing air quality impacts. The USEPA General Conformity Rule requires that a conformity analysis be performed which demonstrates that a Proposed Action does not: 1) cause or contribute to any new violation of any NAAQS in the area; 2) interfere with provisions in the SIP for maintenance or attainment of any NAAQS; 3) increase the frequency or severity of any existing violation of any NAAQS; or 4) delay timely attainment of any NAAQS, any interim emission reduction, goals, or other milestones included in the SIP for air quality. A conformity review must be performed when a Federal action generates air pollutants in a region that has been designated a *nonattainment* or *maintenance* area for one or more NAAQS. *Nonattainment areas* are geographic regions where the air quality fails to meet the NAAQS. *Maintenance* areas are regions where NAAQS were exceeded in the past, and are subject to restrictions specified in a SIP-approved maintenance plan to preserve and maintain the newly regained attainment status. Provisions in the General Conformity Rule allow for exemptions from performing a conformity determination if the total net increase in emissions of individual nonattainment or maintenance area pollutants resulting from implementation of the Proposed Action fall below the significant (*de minimis*) threshold values.

4.1.2 Impacts

4.1.2.1 Proposed Action

Pollutant emissions associated with implementation of the Proposed Action at Tinker AFB would include construction emissions (i.e., fugitive dust emissions) generated during ground disturbance and related site preparation activities and combustion emissions from vehicles and heavy-duty equipment used during construction of the new building and parking area. However, construction emissions would be temporary and would not occur beyond completion of construction activities. Oklahoma County is in an Early Action Compact Agreement with EPA for the 8-hour ozone standard and is designated as an *attainment* area in compliance with all NAAQS.

Construction Emissions

Dust Emissions

Under implementation of the Proposed Action, dust (i.e., PM_{10}, a criteria pollutant) would be generated during construction activities including vegetation removal, grading, and demolition. Dust emissions can vary substantially daily depending on levels of activity, specific operations, and prevailing meteorological conditions. Based on similar studies at other facilities the expected emission rate is 1.2 tons of dust generated per acre per month of activity. Based on this dust-generation factor and the maximum estimated acreage that could be disturbed at any one time, a projected total of approximately 16 tons of dust would be generated; this estimate is conservatively high and is based on the highly unlikely scenario that all proposed construction would occur within a one-month time period. There are no air emission limit or de minimus levels for dust emissions generated during construction projects in Oklahoma. The Oklahoma rules (252:100, subchapter 29) require the use of reasonable controls to prevent the discharge of visible fugitive dust emissions beyond the property line. Increased PM_{10} emissions resulting from proposed construction activities would comprise short-term adverse impacts that could be mitigated through standard dust minimization practices, such as watering exposed soils, soil stockpiling, and soil stabilization. After initial site preparation and grading activities are completed, dust emissions would be significantly less, and once operational, long-term emissions from developed facilities would be negligible.

Combustion Emissions

Combustion emissions associated with construction-related vehicles and equipment would be minimal because most vehicles would be driven to and kept at the affected site for the duration of construction activities. Further, as is the case with PM_{10} emissions associated with site preparation activities, emissions generated by construction equipment would be temporary and short-term.

Operational Emissions

Implementation of the Proposed Action would result in the installation of new, more modern equipment and the transfer of equipment currently utilized in the overhauling, repairing, and testing of fuel control accessories in B3001 and B3108 at Tinker AFB. The majority of the long-term operational emissions associated with the Proposed Action would be emissions from the fuel component testing operations. Other long-term operational emissions associated with the Proposed Action include emissions from the overhaul and repair operations. No additions to personnel would occur as a result of the Proposed Action; therefore, no additional combustion emissions related to personnel transportation would result.

The proposed facility would house equipment that was previously permitted at Kelly AFB (San Antonio, Texas), then subsequently transferred to and permitted at Tinker AFB as a result of a Base Realignment and Closure recommendation in 1995. Transfer and operation of the

equipment required a Prevention of Significant Deterioration (PSD) permit. One permit requirement is to utilize BACT to control emissions. The initial BACT analysis conducted by Tinker AFB concluded that retrofitting B3108 with control devices was not economically feasible due to the proposed replacement of the building and that a review of technology options must be conducted to suit the new facility (Tinker AFB 2007b). After review of the feasibility study presented to DEQ Air Quality Division earlier in 2007, no control of the Stoddard solvent emissions is viable or necessary at this time, based on the following (Appendix D):

- Stoddard solvent is a very low vapor pressure VOC, resulting in lower emissions than the fuels (JP-5/JP-8) used in the equipment in actual operation.
- There are no New Source Performance Standards (NSPS) or Maximum Achievable Control Technology (MACT) subparts covering Stoddard solvent or the test stands that use it.
- Due to the high air flow rate and low VOC concentration, the cost per ton of control is considered excessive for the benefit derived.
- Three years ago a BACT determination showed no controls necessary for twice the amount of emissions as are contemplated for the new Building 3907. In the subsequent three years, no new control options have been introduced since the previous BACT determination was done.
- Based on the RACT/BACT/LAER Clearinghouse (RBLC) (EPA permit and regulations clearinghouse), there are no in-use, full scale operations controlling this type of operation at this time. EPA's guidance requires the control be demonstrated and in full scale use before its implementation can be required.

Given that the proposed Consolidated Fuel Overhaul and Repair Facility would house equipment currently in use in B3001 and B3108, little to no new equipment that would have substantial emissions would be introduced, and emission-control technologies would be applied to equipment and operations at the new facility; therefore, a PSD permit is not required. Fuel component testing emissions are expected to decrease due to the decrease in operational test stands in the new facility. Emissions generated by implementation of the Proposed Action are expected to be below de minimus levels and would represent a less than significant impact. Therefore, the Title V permit would not need to be modified (Appendix D).

4.1.2.2 Alternative 1: No-Action Alternative

If the No-Action Alternative were selected, the building would not be constructed. Therefore, conditions would remain as described in *Section 3.1, Air Quality* and use of existing equipment in current configurations would continue.

4.2 Water Resources

Significance criteria for water resources impacts are based on water availability, quality, and use; existence of floodplains; and associated regulations. An impact to water resources would be significant if it would 1) reduce water availability to or interfere with the supply of existing users; 2) create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or 5) violate established laws or regulations that have been adopted to protect or manage water resources of an area including wetlands. Impacts of flood hazards on Proposed Actions are significant if such actions are proposed in areas with high probabilities of flooding.

4.2.1 Impacts

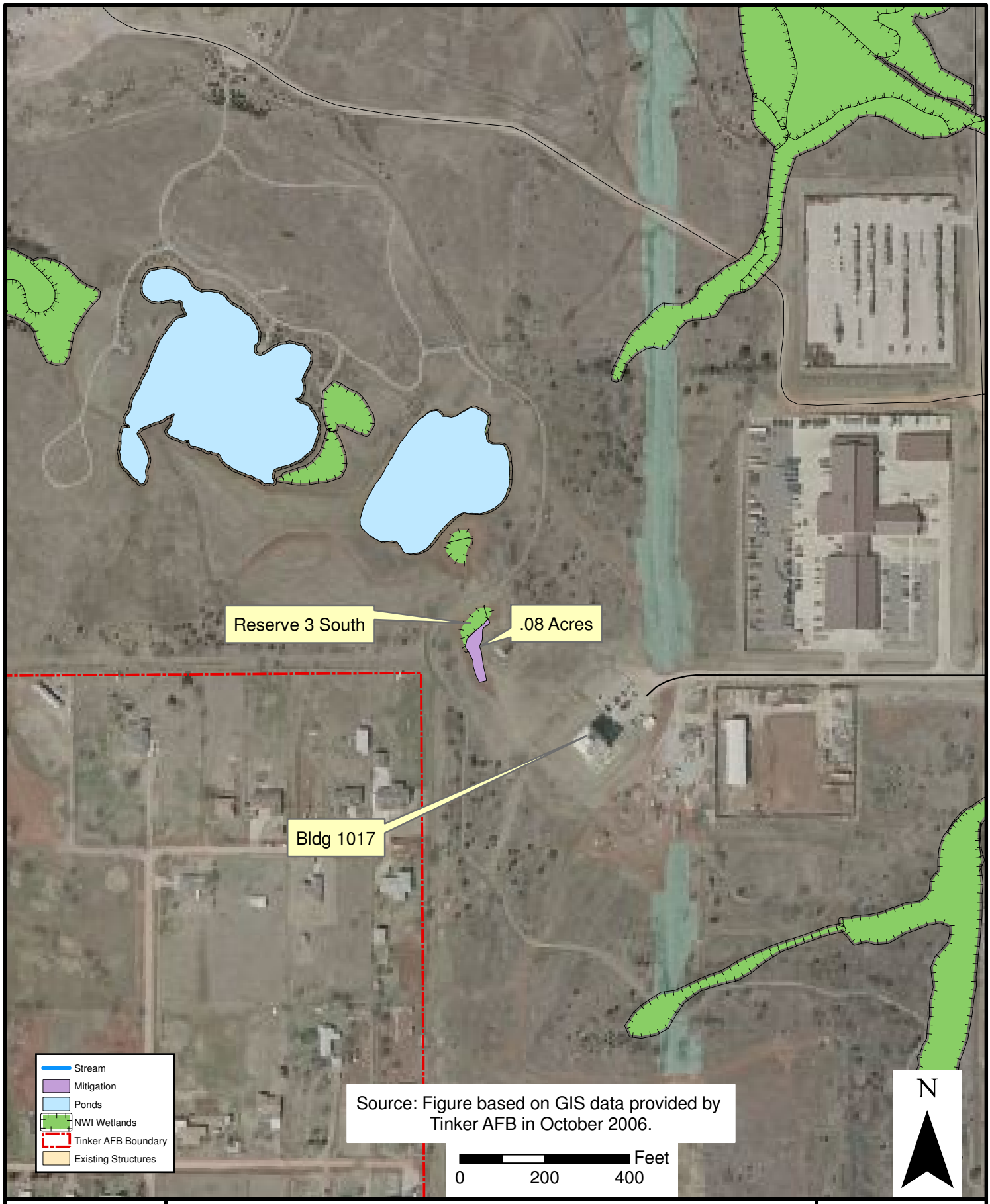
4.2.1.1 Proposed Action

Groundwater

The Proposed Action site does not overlie any known groundwater contamination. It is unlikely that groundwater quality would adversely affect or be affected by constructing a new facility on this site assuming required controls on the handling of hazardous materials and for spill prevention and cleanup are implemented to protect groundwater. Also, the proposed building and parking area does not comprise a significant water user or wastewater generator. Finally, the project site does not overlie an identified groundwater recharge zone of special significance and the footprint of facility development is negligible with regard to groundwater area below the region. Therefore, the Proposed Action would not have an adverse impact on groundwater resources.

Wetlands

Implementation of the Proposed Action would eliminate the 0.83-acre wetland on the Proposed Action site. This wetland is not within the jurisdiction of the USACE and therefore is not protected under Section 404 of the Clean Water Act (Tinker AFB 2007e and Appendix C). However, according to EO 11990, *Protection of Wetlands*, wetland loss must be mitigated. A modified HEP Analysis was conducted for this wetland and a report prepared which quantifies the wetlands' habitat value for three indicator wildlife species (Appendix A of the HEP Analysis [Tinker AFB 2002c]). The numerical values developed in the HEP should be used as targets for mitigation to replace lost habitat. Two mitigation sites have been identified as a replacement site, for which wetland habitats would be either developed or enhanced. The first mitigation site is located south of Reserve 3 South Marsh Filter Pond and northwest of Building 1017 and would add approximately 0.08 acres of wetland to Reserve 3 South Marsh Filter (Figure 4-1). The second mitigation site is located south of Beaver Pond and would add about 0.73 acres of wetland to Beaver Pond Marsh Filter (Figure 4-2). The goal of the mitigation would be to create habitat of equal or greater value.



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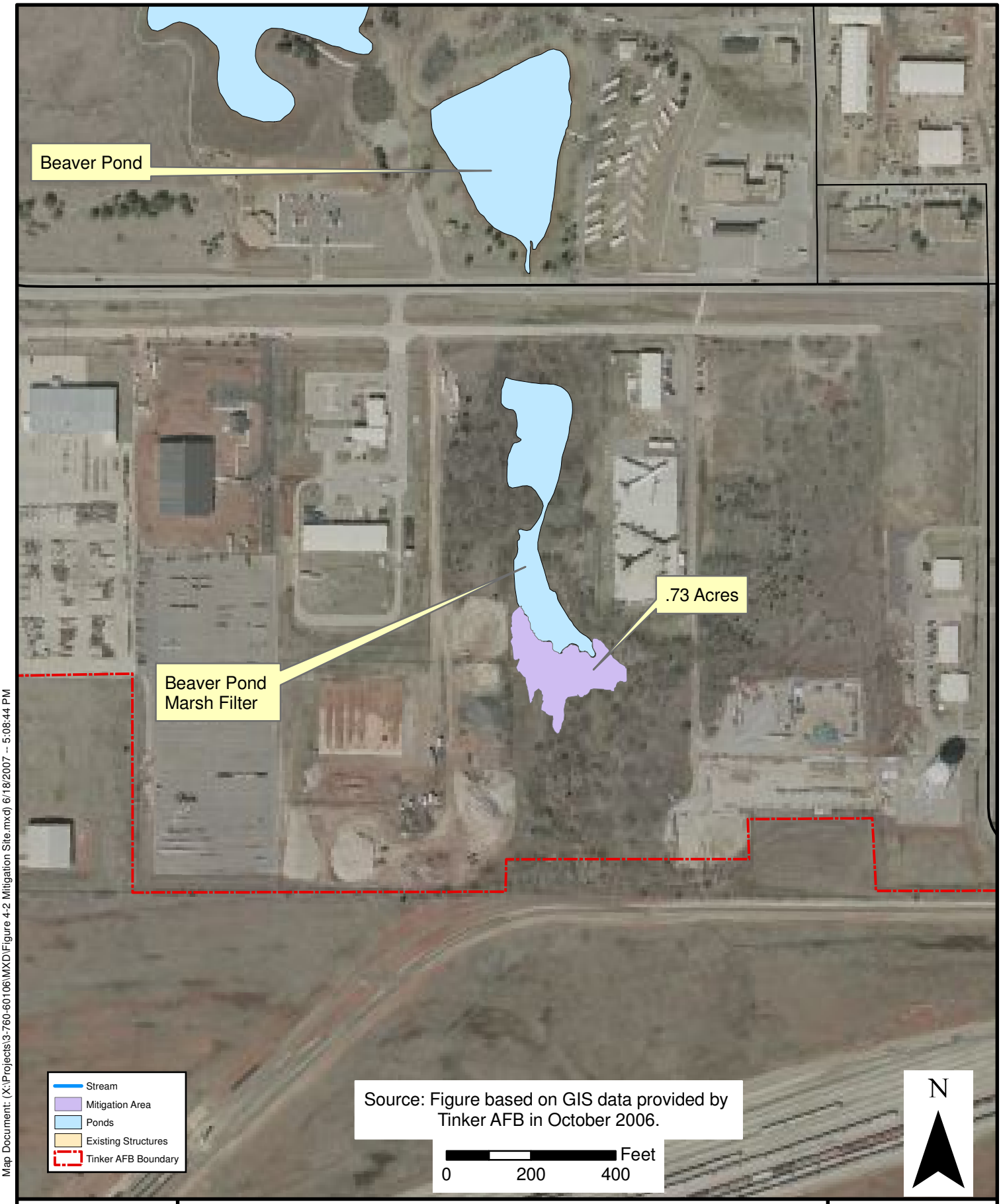
EA

Proposed Wetland Mitigation Site
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE

4-1



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EA

Proposed Wetland Mitigation Site
Construction of Consolidated Fuel Overhaul and Repair Facility
Tinker Air Force Base

FIGURE
4-2

HUs for the three evaluation species are relatively low, especially for the great blue heron and slider turtle, therefore wetland replication with these values should be relatively easy to reach at the proposed wetland mitigation sites and should be considered as absolute minima for replacement wetlands (Tinker AFB 2002c). Exceeding these values should not be difficult. Key missing components limiting Habitat Suitability Index (HSI) values that can be manipulated during wetland mitigation development are water depth and quality of emergent and submergent vegetation. Creating potential nesting habitat for great blue heron is not feasible unless a mitigation site can be located in an area sheltered from human disturbance and containing mature trees. Therefore, implementation of the proposed action would have an adverse impact on wetlands that could be mitigated recreating wetland habitat of equal or greater value, stormwater retention systems, and BMPs.

Floodplains

No 100-year or 500-year floodplains have been identified on the proposed project site. Under implementation of the proposed action, the total impermeable surface area in the watershed of Soldier Creek would be increased by the construction of the proposed parking lot and the building footprint. The increase in impermeable surfaces at the site, considered negligible with relationship to the size of the entire watershed, would be mitigated through the construction of stormwater control mechanisms, such as stormwater retention systems or channeling stormwater flows to non-flood prone areas.

Surface Water

The Proposed Action would involve new construction on currently undeveloped ground. This would increase the potential for soil erosion during construction, resulting in possible adverse impacts on water quality due to increased sediment loading in Soldier Creek. Contaminants, such as petroleum hydrocarbons, in run-off from developed areas of the site, including industrial areas or parking lots, could impact water quality in Soldier Creek. These impacts would be minimized assuming existing non-point pollution requirements are met and spill prevention and response procedures are implemented at the site. Further, implementation of BMPs – such as silt fencing, berm construction around construction sites, etc. – would mitigate potential impacts to negligible levels during construction. Over the long-term, no operations that would affect surface water are anticipated to occur.

The increase in impermeable surface at the site would be mitigated through the construction of stormwater control mechanisms, such as stormwater retention systems or channeling stormwater flows to non-flood prone areas. Discharges of pollutants by stormwater from parking lots and industrial facilities would be eliminated or minimized to the maximum extent practicable. Stormwater control features would be included in the design to eliminate flotables, trash, debris, oil/grease, and other pollutants commonly found in parking lots and industrial areas. NPDES permit #0000809 will be modified and will require a Tier 1 change for the addition of run-off from the new facility. Currently, outfall 014 is located immediately east of B3902. The only

allowable discharge to this outfall is stormwater from B3902. Outfall 014 is currently an open channel at the end of a storm sewer pipe. The new outfall structure would be designed to provide safe access for adequate sample collection and flow gauging to meet permit requirements and would remain in the vicinity of the existing location.

4.2.1.2 Alternative 1: No-Action Alternative

If the No-Action Alternative were selected, proposed construction activities would not be implemented and water resources – including wetland – conditions would remain unchanged from their current status, as described in *Section 3.2*. Selection of the No-Action Alternative would not impact regional or local water resources.

4.3 Biological Resources

4.3.1 Approach to Analysis

Determination of the significance of potential impacts to biological resources is based on 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration of ecological ramifications. Impacts to biological resources are significant if species or habitats of foremost concern are adversely affected over relatively large areas or disturbances cause reductions in population size or distribution of a species of high concern.

USFWS data, Oklahoma Wildlife Department data, and the Tinker AFB *Integrated Natural Resources Management Plan* were reviewed to determine the presence or potential occurrence of sensitive species and habitats in the study area. Potential physical impacts such as habitat loss, noise, and impacts to surface water were evaluated to assess potential impacts to biological resources resulting from implementation of the Proposed Action and identified alternatives.

4.3.2 Impacts

4.3.2.1 Proposed Action

Implementation of the Proposed Action would eliminate the 0.83-acre wetland on the property. A modified HEP Analysis was conducted for this wetland and a report prepared which quantifies the wetlands' habitat value for three indicator wildlife species. The HEP indicates that 0.17 HUs for the slide turtle, 0.56 HUs for the bullfrog, and 0.00 HUs for the great blue heron would be lost. As part of the Proposed Action, wetland habitat would be replaced with that of equal or greater quality which would result in less than significant impacts. Wildlife species that may forage or transit the site are common species and mobile; therefore, these wildlife species could easily avoid direct impacts from the construction activities. Operations at the facility would occur indoors and thus away from potential encounters with wildlife; therefore, no long-term impacts to wildlife would occur under the proposed action.

Due to the limited population size of only a few (3 to 4) Oklahoma penstemon, mitigation is not considered practicable or feasible and regulatory mandates are not required for this plant because it is not a threatened or endangered species. Transplanting has been tried in the past with no success on Tinker AFB. However, the Tinker AFB Integrated Natural Resources Management Plan (INRMP) strategic conservation plan for sensitive species proposes a future project to propagate Oklahoma penstemon plugs in a nursery to try establishment of new populations within the Greenway.

Indirect impacts to biological resources are expected to be negligible. The wildlife habitat that would be cleared for construction is of relatively low quality. Wildlife habitat of higher quality exists to the north, south, and east of the proposed location. Therefore, individual animals that may be displaced by construction could easily find more desirable habitat a short distance away. Operations at the proposed location would take place indoors; therefore, no indirect impacts to biological resources would be expected.

4.3.2.2 Alternative 1: No-Action Alternative

If the No-Action Alternative were selected, Tinker AFB would not implement the Proposed Action. Therefore, no impacts to existing biological resources, as described in *Section 3.3*, would result from selection of the No-Action Alternative.

4.4 Transportation and Circulation

4.4.1 Approach to Analysis

Potential impacts to transportation and circulation are assessed with respect to anticipated disruption or improvement of current transportation patterns and systems; deterioration or improvement of existing levels of service; and changes in existing levels of transportation safety. Beneficial or adverse impacts may arise from the physical changes to circulation (e.g., closing, rerouting, or creating roads), construction activity, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by installation workforce or population changes. Adverse impacts on roadway capacities would be significant if roads with no history of exceeding capacity were forced to operate at or above their full design capacity.

4.4.1.1 Proposed Action

Construction-Related Impacts

The Proposed Action project site is located on the eastside of Douglas Boulevard outside the main perimeter of Tinker AFB in a separate gated and fenced area. Implementation of the Proposed Action would require delivery of materials to construction sites. However, construction traffic would make up only a small portion of the total existing traffic volume in the region, and many of the vehicles would be driven to and kept on site for the duration of construction, resulting in very few actual increased trips. Further, increases in traffic volumes

associated with construction activity would be short-term; upon completion of construction, no long-term impacts to transportation systems would result.

Operation-Related Impacts

Implementation of the Proposed Action would redirect the 76 MXW traffic from B3001 and B3108 away from the main base onto Douglas Boulevard. The Proposed Action includes an approximately 200-space parking area to accommodate the additional 262 employees from B3001 and B3108. Constructing this building and parking area would reduce current traffic congestion and parking issues on base. Access to this area of the base requires swiping a card or entering a code to enter through the gate. With over 100 feet of driveway space from Douglas Boulevard to the gate, there would be minimal impact to transportation and circulation in this area.

4.4.1.2 Alternative 1: No-Action

If the No-Action Alternative were selected, Tinker AFB would not implement the construction project. Therefore, no changes to the transportation, parking, or circulation would occur.

4.5 Hazardous Materials and Wastes

4.5.1 Approach to Analysis

Numerous local, state, and Federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment. The significance of potential impacts associated with hazardous substances is based on their toxicity, ignitability, and corrosivity. Impacts associated with hazardous materials and wastes would be significant if the storage, use, transportation, or disposal of hazardous substances substantially increases the human health risk or environmental exposure.

4.5.2 Impacts

4.5.2.1 Proposed Action

The purpose of the Proposed Action is to increase the efficiency of the overhauling, repairing, and testing of fuel control accessories by the 76 MXW. The increased efficiency would ultimately result in an increased volume in the use of hazardous materials and the consequently the generation of hazardous waste over time. Hazardous waste collection points and procedures would be implemented to manage the waste streams. The increased volume would be accommodated within the existing framework of the management, handling, or disposal processes. Manifesting would not be required because hazardous waste would be transported offsite by licensed contractor rather than off base and back on base to base storage facility. During construction, staging areas would go through proper siting and paper work.

The construction contractor would be responsible to meet city and state codes. Per Tinker AFB Instructions, Section 0720, the city and state codes are part of the Request for Proposals for construction contracts. Only negligible impacts involving hazardous materials and wastes would occur as a result of the Proposed Action.

4.5.2.2 Alternative 1: No-Action Alternative

If the No-Action Alternative were selected, Tinker AFB would not implement the Proposed Action. Therefore, no impacts with regard to hazardous materials would occur and conditions would remain as described in *Section 3.5.*

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SECTION 5
CUMULATIVE IMPACTS

Cumulative impacts on environmental resources result from incremental impacts of the Proposed Action when combined with other past, present, and reasonably foreseeable future projects in an affected area. Cumulative impacts can result from minor but collectively substantial actions undertaken over a period of time by various agencies (Federal, state, or local) or persons. In accordance with the National Environmental Policy Act, the cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future are discussed below.

Projects in addition to the Proposed Action are planned in the vicinity of the Eastside Depot Maintenance District of Tinker AFB. These projects include:

- B3108 is scheduled for demolition in plans currently under development. The demolition will take place over the course of a five to ten-year period (FY12-20).
- Construction of the MROTC began in spring 2006 (Phase 1) east of the current base boundary on Douglas Boulevard. The finished facility is proposed to be 1.6 million square feet with 17 hangars on 370 acres. Currently, the MROTC has completed one hangar and the towway connected to Tinker AFB just south of the Twaddle Armed Forces Reserve Center. As part of the final phases of development of the MROTC, plans are to re-route and/or close Douglas Boulevard from public access. It is projected that the MROTC will bring around 325 new jobs to the area.

Projects occurring in other areas of Tinker AFB and in the vicinity of Tinker AFB are included in Table 5-1.

Table 5-1. Projects occurring at or near Tinker AFB.

DMRT Three Bay Hangar (FY08)	Construction of a three-bay, multi-aircraft fuel-capable hangar sized for KC-135, E-3, B-1, B-52, and KC-X (Next generation) tanker aircraft. The facility is proposed for construction west of B2280 (which is located on the industrial east side of the base). The new facility is required as part of the Programmed Depot Maintenance (PDM) for KC-135. Workload and repairs for this aircraft take place in three separate facilities that are inadequate in size. The new hangar is required to adequately address these issues and also to consolidate workload and function, improving efficiency.
Construct Air Traffic Control Tower (Possible FY08)	Construct a new eleven story Air Traffic Control Tower. Construction to include reinforced concrete piers, control tower cab with tinted double glazing, elevator, flight command and administrative area, supervision and simulation training area as well as fire protection, utilities, back-up power, lighting protection, access road, and any other necessary support for a complete and useable facility. Project to include minimum DoD antiterrorism force protection requirements and demolition of existing control tower and access road

Table 5-1. Projects occurring at or near Tinker AFB (Cont.)

Military Family Housing Privatization (FY08)	Air Force implementation of the privatization initiative which involves leasing of all housing areas to a private developer for 50 years. The Air Force also will convey all 694 existing military units to the developer and depending on the alternative selected the developer would implement a combination of demolition, renovation, and /or construction of housing units to meet the end-state requirement of 660 housing units. Once privatization is implemented, the developer will own, operate, and manager all housing units on the installation while leasing the land underlying the housing communities (approximately 224 acres) for a period of 50 years. Depending on the developer, there will be a combination of demolition, renovation, and new construction distributed throughout the military family housing areas. Included will be alternatives to desired community features such as a sound protection buffer along Sooner, lighted tennis and basketball courts, and an outdoor fitness area.
Realignment of Air Depot Road/Tinker Gate (Possible FY08)	Relocation of Air Depot Road/Tinker Gate located on the west side of the base. Relocation is required to provide an adequate and secure base entry. Relocation will alleviate current hazardous traffic congestion and will maintain the base perimeter security. The existing roadway alignment poses a safety issue and does not meet security requirements.
Construct Consolidated Wing Headquarters Facility (FY10/11)	Construction of a consolidated wing headquarters building for distinct legal staff to include a Headquarters Command Section, Resource Manager, Public Affairs, Base Plans, 72 Mission Support Group. 72 Mission Support Squadron, as well as a large Staff Judge Advocate facility. Project involves construction of a multi-story steel frame building on piers and concrete slab. Demolition of B460 and reconfiguration of the road intersection at Arnold and F Streets will also be included in the project. Construction of the new facility is required because the existing building is antiquated and is in violation of the American Disabilities Act. Existing facility also does not meet the Air Force Legal Facilities Design Guide and has insufficient Indoor Air Quality. There are problems with mold, wood rot and the building has suffered termites in the past.
Construct Medical Clinic (FY09)	Construction of a new medical clinic, approximately 172,000 sq ft in the open land area northeast of Gott Gate. The new facility will replace the existing clinic and would result in the demolition of the Central Plant, which contains both the chillers and boilers that service the clinic. Demolition of the boiler would also result in de-commissioning an underground diesel storage tank. This proposed project will also include a medical squadron building as well as the War Readiness Materials warehouse. The new clinic will house doctors' offices, exam and treatment rooms, laboratories, radiology, pharmacy, dental clinic, conference and training rooms, as well as storage areas. Energy to operate the new boilers will include a combination of diesel fuel, stored in above ground storage tank and natural gas. The existing medical clinic will also be demolished (approximately 184,000 square feet). Upon completion of the new facilities, the existing medical clinic and TRICARE facility (B5803) will also be demolished.

Table 5-1. Projects occurring at or near Tinker AFB (Cont.)

507th BRAC Action (FY08)	As recommended by BRAC, the following actions will take place: • The relocation of operations and maintenance personnel associated with the 137 Airlift Wing of the Air National Guard from Will Rogers AGS to Tinker AFB, where the 137 AW will become an associative wing, operating with the 507th Air Refueling Wong of the Air Force Reserve Command. Although the 137 AW currently operates eight C-130 cargo aircraft, those aircraft will not follow the 137 AW to Tinker AFB but rather relocated to Pope AFB in Fayetteville, North Carolina • The transfer of four KC-135R aircraft from the 939 Air Reserve Wing from Portland International Airport Air Guard Station to Tinker AFB • The demolition and construction of facilities to support the additional personnel and aircraft. To implement the BRAC action, Tinker AFB has proposed the following: • Construction of Air Force Reserve Command and Air National Guard squadron operations, operations support squadron, life support storage, and life support work area • Construction of a new hangar with hangar access and associated demolition of B1037 and B1041, which would also correct a current deficiency at Tinker AFB • Renovation of B1048
Phase III, 3rd Combat Communications Complex (FY13)	The purpose of this project is to design and construct a new Squadron Operations Complex for the 32nd Combat Communications Squadron at Tinker AFB. The new facility will replace thirteen substandard existing facilities. The new consolidated facility will enhance the squadron's capability to train, maintain its equipment and to deploy to any location in the world. The 3rd Combat Communications Group is a tenant on Tinker AFB that provides deployable communications, computer systems, navigational aids and air traffic control services anywhere in the world. The new facility will support a squadron of approximately 141 personnel. The site is located east of Air Depot north of Reserve Road. The Squadron Operations Complex is organized around a core containing the common areas: restrooms, supply room, conference room and training room for all Flights. There are three flight bays located off the core area that provide each flight with conditioned office space, electronic workbenches and drive through bay areas to store, palletize and maintain deployable equipment. The front of the facility contains offices for the Squadron Commander and the Squadron administrative functions.
Oklahoma County Construction Near Hruskocy Gate (FY08)	Granting of a real estate easement to allow construction of a fence and roadway adjacent to Hruskocy gate on Tinker AFB property. Hruskocy Gate will be re-located south of its existing site to prevent traffic problems on I-40.
Construct Physical Fitness Center (FY10/11)	Construct a physical fitness center to include a health and wellness center to include cardiovascular room, equipment and free weight room, exercise rooms, racquetball rooms, indoor track, Olympic size pool, child play area, 2 full court basketball courts, DV locker rooms, as well as men and women's restrooms. Facility is 8445 SM in size. This project will also include demolition of 5922, 5937, 5927, 5916, 5915, 5924, 5920, 6004, and 216. New facility will be constructed on the west side of the base.

Table 5-1. Projects occurring at or near Tinker AFB (Cont.)

Child Development Center (FY10)	Construction of a new Child Development Center in the southwest portion of the Base, north of SE 59th Street and northwest of Gott Gate in the South Forty Area. Size of the facility would be approximately 32,877 square feet. The proposed action would be located approximately 375 feet west of Air Depot Road and approximately 100 feet north of the Base fence line. Approximately 130 feet of the Urban Greenway Multi-Use trail would be removed and re-routed as a result. The new Child Development Center will provide for the care and training of dependent children of both military and civilian personnel assigned to the base. The building will contain areas for child activities, staff support, facility support, core administration, and maintenance. 2.1 acres of land will be required surrounding the facility.
DLA Warehouse (FY08)	Construction of a 167,575 square foot, permanent, non-combustible, General Purpose warehouse with a 25' clear stack height, weather sealed door trucks, loading/unloading docks with dock levelers, paved roadways, and connection. The facility will require steam heat from the Central Heat Plant or boiler. All electrical, mechanical, and fire protection system will meet national, state, and local code requirements. Annex shall house a 123 square meter administrative area with a lunch/break area, restrooms, and locker rooms. A utility annex shall house all the utility functions for this facility. There are 18 depots within the continental United States, most of which are located on active military bases. These Depots support the mission of the Military Installation on which they are located. These Depots also store general commodities. BRAC identified the requirement for construction of additional warehouses at the Defense Distribution Depot Oklahoma City (located at Tinker AFB). This is a BRAC requirement.
Consolidated Security Forces, South 40 Development (FY10/11)	Construction of a 64,000 square foot facility on the south side of the base. This project is to construct a new facility to relocate and consolidate key Security Police Operations functions at a single facility. One centralized facility will reduce the response time to react to various situations.
E-3 AWACS parking Apron Consolidation, Charlie Row (FY13)	Construction of all pavements and to make site improvements to add one new row of aircraft, consisting of six additional E-3 parking spaces, to the north AWACs parking apron. This will involve moving Taxiway Brawo to the south relocating existing apron ball park lighting, fire hydrants and perimeter security, and adding the existing stormwater, lighting, and other utilities as required. The current AWACs operations are split between the north and south ramps hindering operational cost and effectiveness of the E-3 flying mission. This project will consolidate all E-3 aircraft on the north ramp and enable the four operational flying squadrons, two training squadrons, and four maintenance squadrons to consolidate a large portion of their work load. This project is the first critical step in the total consolidation of AWACS operations on Tinker AFB. Execution of this project is critical to consolidation and transformation of AWACs operations on Tinker AFB and ensuring the 552nd Air Command Wing remains war ready throughout the expected E-3 service life and beyond. Location is on the north central part of the base.
Harry Twaddle Acquisition (FY10)	The U.S. Army Reserve's 95th Division (Institutional Training) would move to Fort Sill, as the facility it is based at – the Major General Harry Twaddle United States Armed Forces Reserve Center, Oklahoma City, Okla. The Reserves Center would be acquired by Tinker AFB. Approximately 152,000 square foot acquisition.

The projects listed above are planned for construction during roughly the same timeframe as implementation of the Proposed Action would occur. Consequently, the potential exists for cumulative environmental impacts to occur with regard to air quality, noise, socioeconomics, and traffic. Cumulative air quality and noise impacts are expected to be less than significant since all projects would be required to implement BMPs to reduce air and noise emissions below significance thresholds and comply with local noise regulations.

With regard to traffic and circulation, if the MROTC and the City's construction projects occur concurrently with the projects on Tinker AFB, short-term impacts to traffic caused by additional construction equipment and construction workers traveling along surrounding roadways could potentially cause a short-term adverse cumulative impact during peak traffic hours. However, construction will be short-term and ultimately traffic on base could be improved with the re-routing or closure of Douglas Boulevard to public access. Therefore, cumulative impacts to transportation and circulation are expected to be less than significant.

Regionally, the General Motors (GM) plant located south of Tinker AFB recently closed. This closure resulted in a decrease in traffic in the vicinity of Tinker AFB which offset increases in traffic associated with construction of the Proposed Action. However, this decrease would be temporary if the former GM plant is purchased and re-opened as a manufacturing facility.

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SECTION 6
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SECTION 7
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APPENDIX A

State Historic Preservation Office (SHPO) and Oklahoma Archeological Survey Letters

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Oklahoma Historical Society *Founded May 27, 1893*

State Historic Preservation Office
Oklahoma History Center • 2401 North Laird Ave. • Oklahoma City, OK 73105-7914
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

April 23, 2007

Mr. Tim Taylor
Environmental Engineering Operations Section
Department of the Air Force
72 ABW/CEVOE
7701 Arnold Street, Room 109
Tinker AFB, OK 73145-9100

RE: File #1171-07; Tinker Consolidated Fuel Control Facility Project
(Sec.24 T11N R2W)

Dear Mr. Taylor:

We have received and reviewed the documentation concerning the referenced project in Oklahoma County. Additionally, we have examined the information contained in the Oklahoma Landmarks Inventory (OLI) files and other materials on historic resources available in our office. We find that there are no historic properties affected by the referenced project.

Thank you for the opportunity to comment on this project. We look forward to working with you in the future.

If you have any questions, please contact Charles Wallis, RPA, Historical Archaeologist, at 405/521-6381.

Should further correspondence pertaining to this project be necessary, the above underlined file number must be referenced. Thank you.

Sincerely,

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:bh

Oklahoma Archeological Survey

THE UNVERSITY OF OKLAHOMA

March 23, 2007

Trudi Logan
Department of the Air Force
72 Air Base Wing (AFMC)
7701 Arnold Street Room 109
Tinker Air Force Base, OK 73145-9100

RE: Proposed construction of a new Consolidated Fuel Control Facility next to existing Building 3902. Legal Description: N ½ SW ¼ NW ¼ Section 24 T11N R2W, Oklahoma County, Oklahoma.

Dear Ms. Logan:

The Community Assistance Program staff of the Oklahoma Archeological Survey has reviewed the above referenced project in order to identify potential areas that may contain prehistoric or historic archaeological materials (historic properties). The location of your project has been crosschecked with the state site files containing approximately 18,000 archaeological sites that are currently recorded for the state of Oklahoma. No sites are listed as occurring within your project area, and based on the topographic and hydrologic setting; no archaeological materials are likely to be encountered. Thus an archaeological field inspection is not considered necessary. However, should construction activities expose buried archaeological materials such as chipped stone tools, pottery, bone, historic crockery, glass, metal items or building materials, this agency should be contacted immediately at (405) 325-7211. A member of our staff will be sent to evaluate the significance of these remains.

This environmental review and evaluation is performed in order to locate, record, and preserve Oklahoma's prehistoric and historic cultural heritage in cooperation with the State Historic Preservation Office, Oklahoma. Historical Society. In addition to our review comments, under 36CFR Part 800.3 you are reminded of your responsibility to consult with the appropriate Native American tribe/groups to identify any concerns they may have pertaining to this undertaking and potential impacts to properties of traditional and/or ceremonial value. Thank you.

Sincerely,

Elizabeth Thompson
Staff Archaeologist

Robert L. Brooks
State Archaeologist

:ls

Cc: SHPO

DEPARTMENT OF THE AIR FORCE
72 AIR BASE WING (AFMC)
TINKER AIR FORCE BASE, OKLAHOMA

FILE COPY

MEMORANDUM FOR STATE HISTORIC PRESERVATION OFFICE
ATTN: MS MELVENA HEISCH
2401 NORTH LAIRD AVENUE
OKLAHOMA CITY OK 73105

APR 0 2 2007

FROM: 72 ABW/CEVOE
7701 Arnold Street Room 109
Tinker AFB, OK 73145-9100

SUBJECT: Prehistoric Resources Review of NW1/2S1/2NW1/4 Section 24 T11N R2W

1. Tinker AFB is requesting a concurrence of a review by the Oklahoma Archeological Survey of prehistoric resources for land owned by Tinker AFB which Building 3902, Consolidated Fuel Controls Test Facility is located. The land to be reviewed is NW1/2S1/2NW1/2 Section 24 T11N R2W. This review focusing on prehistoric resources by the Oklahoma Archeological Survey is required as part of the Section 106 review process. The review will be incorporated into the Environmental Assessment for the Construction of a new Consolidated Fuel Control Facility next to Building 3902. The Oklahoma Archeological Survey found through their review that no archeological sites are listed as occurring within the project area, and based on the topographic and hydrologic setting; no archeological materials are likely to be encountered. Therefore an archeological field inspection is not considered necessary.

2. Enclosed is a copy of the Oklahoma Archeological Survey letter dated 23 March 07 and a USGS Topography Map indicating the site. For additional information, our point of contact is Mr. Tim Taylor at 739-7062.

ORIGINAL

TIM TAYLOR, CRPM
Environmental Engineering Operations Section
Environmental Management Division

Attachments:
1. Oklahoma Archeological Survey letter
2. USGS Topography Map

The University of Oklahoma

OKLAHOMA ARCHEOLOGICAL SURVEY

April 26, 1993

Carol B. Barker, Acting Chief
Environmental Compliance Support Branch
Department of the Air Force
AFMC
OC-ALC/EMCS
8745 Entrance Road A
Tinker Air Force Base, OK 73145-3303

Re: Proposed acquisition of two tracts of land. Air Logistics Center, Tinker Air Force Base. Legal Description: Section 27 T11N R2W, Oklahoma County, Oklahoma.

Dear Ms. Barker

The above referenced project has been reviewed by the Community Assistance Program staff of this agency to identify potential areas that may contain prehistoric or historic archaeological materials. The location of your project has been cross-checked with the state site files containing approximately 14,000 archaeological sites which are currently recorded for the state of Oklahoma. No sites are listed as occurring within your project area, and based on the topographic and hydrologic setting, no archaeological materials are likely to be encountered. Thus, an archaeological field inspection is not considered necessary. However, should construction activities expose buried archeological materials such as chipped stone, tools, pottery, bone, historic crockery, glass, metal items or building materials, this agency should be contacted immediately at (405) 325-7211. A member of our staff will be sent to evaluate the significance of these remains.

This environmental review and evaluation is performed in order to locate, record, and preserve Oklahoma's prehistoric and historic cultural heritage in cooperation with the State Historic Preservation Office, Oklahoma Historical Society. Thank you for your cooperation.

Sincerely,

Robert L. Brooks
State Archaeologist

Staff Archaeologist

:lw

cc: SHPO

1808 Newton Drive, Norman, Oklahoma 73019-0540 PHONE: (405) 325-7211

Oklahoma Historical Society *Founded May 27, 1893*

STATE HISTORIC PRESERVATION OFFICE
621 N. ROBINSON, SUITE 375 • OKLAHOMA CITY, OK 73102 • (405) 521-6249

By Certified Mail to EMCS — Mark/Larry

April 12, 1993

Mr. Robert Reed, Chief
Environmental Compliance Division
Dept. of the Air Force
OC-ALC/EMC
8745 Engrance Road A
Tinker Air Force Base, OK 73145

RE: File #0776-93; Tinker Purchase of Land for Construction Project, Tracts 1 & 2, NW Sec.27 T11N R2W

Dear Mr. Reed:

We have received and reviewed the documentation submitted concerning the referenced project in Oklahoma County.

Examination of historic resource files in this office finds no properties documented within the project area that meet the criteria for listing on the National Register of Historic Places. Our research indicates that there is little likelihood such historic properties will occur.

In addition to review by this office, a review focusing on prehistoric resources by the Oklahoma Archeological Survey is required for determining the presence of National Register quality prehistoric sites. Documentation on any historic archaeological site discovered in the course of archaeological surveys should be submitted to the State Historic Preservation Office for review. This is an integral part of the Section 106 process.

Should the Oklahoma Archeological Survey conclude that there are no prehistoric archaeological sites of National Register quality, and should no historic site have been discovered in the process of survey, the State Historic Preservation Office finds no properties eligible for the National Register of Historic Places within the referenced project boundaries.

Should further correspondence pertaining to this project be necessary, the above underlined file number must be referenced. If you have any questions, please contact Mr. Marshall Gettys, Historical Archaeologist, at 405/521-6249. Thank you.

Sincerely,

Melvena Heisch

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:pm

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APPENDIX B

Economic Analysis, Consolidated Fuel Overhaul, Repair, and Test Facility, Tinker AFB. 8 April 2005

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ECONOMIC ANALYSIS

CONSOLIDATED FUEL OVERHAUL, REPAIR AND TEST FACILITY WWYK043008

Updated 8 April 2005

Deborah Tomlinson, Cost Analyst
OC-ALC/FMC, DSN 339-7373
Email: deborah.tomlinson@tinker.af.mil

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS

INSTALLATION/MAJCOM: Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB OK/AFMC

PROJECT TITLE: Consolidated Fuel Test, Repair and Overhaul Facility

PROJECT NUMBER: WWYK043008

PROJECT OBJECTIVE: Determine the most cost effective means to provide 12,987 square meters (140,000 square feet) of industrial production space for the 76th Commodities Maintenance Group.

PROJECT COST: $35,000,000

CERTIFICATION: This economic analysis follows the guidelines and procedures contained in AFI 65-501, "Economic Analysis". Our review indicates the analysis meets the minimum requirements of AFI 65-501, AFMAN 65-506, and AFMAN 32-1089. Significant changes to project scope, major assumptions, or estimated costs will invalidate this certificate and require revision of this analysis.

COORDINATION AT BASE/INSTALLATION LEVEL:

Concurrence by OC-ALC Functional Office:

31 May 05
Date

DANIEL M. LOMBARDI, Colonel, USAF
Commander, 76th Commodities Maintenance Group

(Print) (Name/Office Symbol/DSN)

OC-ALC/FMC Certification

for 31 MAY 05
Date

GARY L. GAUGHRAN, Chief
Acquisition Cost Division
OC-ALC/FMC

(Print) (Name/Office Symbol/DSN)

76 CPTS/FM Certification/ Concurrence

3 Jun 05
Date

Civil Engineering
Concurrence

3JAN05
Date

COORDINATION at MAJCOM LEVEL:

Financial Analysis Office:
(Signature/Date)

(Print) (Name/Office Symbol/DSN)

MAJCOM FM Certification:
(Signature/Date)

(Print) (Name/Office Symbol/DSN)

MAJCOM Functional Office:
(Signature/Date)

(Print) (Name/Office Symbol/DSN)

MAJCOM Civil Engineering Office:
(Signature/Date)

(Print) (Name/Office Symbol/DSN)

EXECUTIVE SUMMARY

INSTALLATION/MAJCOM: Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB OK/AFMC

PROJECT TITLE/NUMBER: Consolidated Fuel Overhaul, Repair, and Test Facility/ WWYK043008

PROJECT SCOPE and COST: 12,987 Sq M = 140,000 Square Feet, $35,000,000

OBJECTIVE: Determine the most cost effective means to provide 12,987 square meters (140,000 square feet) of industrial production space for the 76th Commodities Maintenance Group.

ALTERNATIVES CONSIDERED/ANALYSIS RESULTS:

ALTERNATIVEs CONSIDERED	NPV	BENEFIT SCORE	COST/ BENEFIT RATIO	SIR	DPP (years)
Status Quo	$ 1,944,131,766	4.80	405,027,451.00	NA	NA
Renovation	$ 1,972,867,266	14.50	136,059,811.00	0.50	NA
New Construction	$ 1,723,349,932	21.50	80,155,811.00	7.30	3.90

Life cycle cost analysis results are presented in the preceding table. Alternative One - Status Quo has the next to highest net present value life cycle costs of the three alternatives considered. Status Quo also has the lowest benefit score, resulting in the highest cost/benefit ratio.

Alternative Two - Renovation, is the highest cost alternative in terms of net present value life cycle cost. The alternative yields median values for benefits and cost/benefit ratio. It yields a SIR less than one and does not achieve payback within the analysis period. Additionally, a renovation will not achieve the efficiencies of consolidation, nor does it change the fact that the underlying facilities are over 60 years old and have exceeded their normal useful life.

Alternative Three - New Construction, has the lowest net present value life cycle costs of the three alternatives. New Construction also has the highest benefit score resulting in the most favorable cost/benefit ratio of the alternatives considered and yields a SIR of 7.3 to 1. For every dollar of investment, this alternative yields $7.30 in savings, generating sufficient savings to pay for itself in 3.9 years.

The analysis results are insensitive to changes in key cost drivers within a reasonable range of variation (+/- 25%). The analysis results are insensitive to changes in the discount rate between 3.23 and 3.88 percent (+/- 25%).

CONCLUSION:
Alternative Three - New Construction, Project WWYK043008, Consolidated Fuel Overhaul, Test and Repair Facility, is recommended for approval, funding and implementation.

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1.0 Background

The 76th Commodities Maintenance Group of the Oklahoma City Air Logistics Center (OC-ALC) located at Tinker Air Force Base uses Building 3108 for testing of aircraft fuel controls. Additionally, portions of the overhaul, test and repair functions are performed in Building 3001, sited adjacent to Building 3108, and Building 3902, sited approximately .75 miles from Building 3108.

2.0 Impact

If a MILCON project to correct the current facility deficiencies in Building 3108 is not funded and executed, fuels personnel will continue to be housed in substandard, outdated and inefficient facilities. Existing work areas will be inadequate to accommodate the modern equipment required to efficiently process the fuel controls. Geographically separated facilities will continue to impact process timelines and delay the return of aircraft to operational status. Cost savings due to improved efficiencies of a consolidated facility will not be realized. There is a risk of a catastrophic failure in the existing facilities, which has the potential to cause a total work stoppage. If the work stoppage is of significant duration, aircraft may be grounded, depriving the warfighter of needed Air Force assets.

3.0 Objective:

Determine the most cost effective means to provide 12,987 square meters (140,000 square feet) of industrial production space for the 76th Commodities Maintenance Group.

4.0 Alternatives Considered

4.1 Alternative One – Status Quo: the Status Quo alternative calls for the continued use of existing facilities (Buildings 3108, 3001 and 3902) to perform the overhaul, repair and testing of fuel controls. Portions of Building 3108 are over 60 years old, are in deplorable condition and require major investment on a continuous basis to maintain in a safe and operable condition and to correct the most urgent and serious problems. Even with ongoing repairs there is a potential for utilities and structural failure due to the age and degraded condition of the facility. In order to adequately document the condition of the existing facilities, we toured Building 3108. In the course of our tour, we observed numerous facility deficiencies.

The air handler in the south annex needs to be replaced since it is over its useful life. There are rooms that are intolerably hot, over 120 degrees. At times, the production in these rooms must be shut down. Normally, one to two times a week, production will cease somewhere because of temperature. The heating and cooling system cannot be adequately controlled. There is no automated system. The only way to control the heating and cooling is to manually adjust some flow valves, which is not very effective.
Fuel testing involves hazardous fumes. Air must be constantly replaced to eliminate the threat of dangerous build-ups of fumes that can lead to explosion and fire. The test

stands' exhaust system is marginal. Air handler failure compromises the safety of personnel and mission capability, in addition to placing high value equipment at risk. The oil leak on the south air handling unit must be stopped prior to the replacement of the roof.

The entire roof deck on the south end needs replacement. The roof is in the process of collapsing under its own weight. We observed water damage and major cracks in the concrete deck. There are instances of pressure causing concrete chunks to break away from the ceiling and fall, which poses a hazard to personnel and equipment. The remediation is sealing of cracks as they appear. Not only did we see instances of water damage from roof leaks, there were also instances where tar used for sealing is leaking through the cracks in the roof. Tar leakage shows how seriously depleted the waterproofing is. Also, tar is much more viscous than water, so tar leakage shows how badly compromised the roofing system is.

Certain rooms have explosion proof barriers. Four years ago, the USAF Fire Marshall toured the facility and shut it down on the spot because the explosion proof barriers were so deteriorated. He declared it a Risk Assessment Code (RAC) 1 at the time. The base did an emergency repair, but recognizes that this was, at best, a "band-aid" fix. The base replaced deteriorated World War II vintage asbestos tile with sheetrock. We were shown instances in which water leakage from the roof is already causing the sheet rock to deteriorate.

Water mains are deteriorated. Recently an underground water main blew out. When the main blew out, it buckled the concrete in a loading dock. The entire concrete loading dock had to be jack hammered in order to reach the water main to repair it and then the loading dock had to be replaced.

The north end of the building has asbestos siding. The siding is deteriorating. The engineer showed us where chunks of the siding had come off and cracks in the siding where we could expect future deterioration. This presents a health risk to our personnel. The removal and replacement of asbestos siding is very expensive.

A new problem is developing with World War II era cast iron doors from World War II that were once used as loading docks. The doors can no longer be opened due to corrosion. However, they are separating from the door seam because the hinges can no longer hold them. Once they separate, then structural integrity is lost because now the interior test and production areas are totally exposed to the outside elements. The doors are incredibly heavy and pose a serious hazard should they collapse.

The current facility configuration for the fuel control overhaul, repair and test function is inherently inefficient. Having the test functions located in Building 3108 and Building 3902 and the overhaul function in Building 3001 necessitates frequent transportation of both personnel and fuel controls. Personnel transport fuel controls from Building 3001 to Building 3108 using carts and use a van to transport them from Building 3001 to

Building 3902. Transporting the fuel controls takes a significant amount of time, in addition to increasing the risk of damage to the fuel controls.

Building 3108 is in the aircraft accident clear zone. Relocating the facility removes a threat to personnel and equipment by aircraft crash, as well as an impact object for an aircraft in an emergency situation.

In 1991 the U.S. Army Corps of Engineers, Tulsa District, conducted a Hazardous Fuel Component Study for Building 3108. This study documented numerous deficiencies which required remediation in order to ensure the continued viability of the facility. Although over $13.9 million has been invested in this facility from FY99 through FY04, this amount was only sufficient to remediate the most critical deficiencies. Non-critical projects have been deferred due to funding constraints and in anticipation of a MILCON project to replace this inadequate facility. If MILCON funding for a new facility is not forthcoming, the remaining $7.7 million in facility investment will be required early in the project life cycle in order to ensure the continued viability of the facility.

4.2 Alternative Two – Renovation: This alternative calls for extensive renovation of the existing production space in Building 3108 and portions of Building 3001. All deficiencies cited in the 1991 Corps of Engineers Hazardous Component Study in violation of the Uniform Building Code, Uniform Fire Code, Life Safety Code (NFPA 101), Flammable and Combustible Liquids Code (NFPA 30), and National Electrical Code will be corrected during the renovation. Production will continue during construction phase, with construction activities being performed during off-shift (third shift) hours. Some short-term negative impact to production is expected with this alternative.

4.3 Alternative Three – New Construction: This alternative calls for the construction of a new 12,987 square meter (140,000 square foot) Consolidated Fuel Test Repair and Overhaul Facility. The new facility will be custom configured for the workload it houses, incorporating the most up to date industrial production methods. Additionally, the new facility will be located adjacent to Building 3902, thereby eliminating the need to transport commodity items over long distances and reducing response time for overhaul mechanic assistance when trouble shooting during testing. The new facility will provide the optimum environment for the implementation of lean cellular manufacturing practices, which will lead to a step change improvement and will produce substantial savings in direct labor, direct materials and overhead.

5.0 Ground Rules and Assumptions

5.1 The base year of the analysis is 2008, the first year for which costs differ between the alternatives. All costs are expressed in FY08 constant dollars to coincide with the program year.

5.2 New construction will have a 55-year economic life. The new construction alternative is assigned a residual value using a 55-year economic life and straight line depreciation.

5.3 The Status Quo and Renovation alternatives will have a 25-year economic life.

5.4 An analysis period of 28 years was chosen to coincide with the 25-year economic life of the remodeled facility, and to allow three years for construction.

5.5 New Construction and Renovation will require three years with beneficial occupancy in FY11.

5.6 Recurring annual maintenance and repair costs are escalated over the useful life of the new and renovated facility in accordance with Building Age Multipliers from AFMAN 32-1089, Figure 2.5.

5.7 Electricity consumption will be reduced by 25% for Renovation and 35% for New Construction.

5.8 Water and sewage disposal utility costs are expected to remain the same for all alternatives.

5.9 All costs except residual value occur throughout the year and are discounted using a "middle-of-year" discounting convention. The residual value is discounted using an "end-of-year" discounting convention.

5.10 All non-energy costs expressed in "then-year" dollars are inflated to the program year using FY08 raw inflation indices from the AFI 65-503, Table A45-1.

5.11 Energy costs expressed in "then-year" dollars are inflated to the program year using Global Insight Energy Inflation Factors from the AF Portal, SAF/FMC.

5.12 The remodel and new construction alternatives will be covered by a standard, one-year construction warranty; therefore, no maintenance and repair costs will be incurred for the first year of occupancy.

5.13 None of the alternatives require the acquisition of real estate.

5.14 Based on engineering judgment of current system conditions, periodic maintenance and repair cash flows for the status quo alternative reflect replacement of most major system components at the beginning of the analysis period. Future replacements are based on system life cycles from AFMAN 32-1089, Figure 2.6.

5.15 Periodic maintenance and repair cash flows for renovation and new construction are aged from the year of beneficial occupancy of the renovated or new facility, based on system life cycles from AFMAN 32-1089, Figure 2.6.

5.16 Slight differences in totals are due to rounding.

5.17 For Alternative One – Status Quo and Alternative Two – Renovation, personnel will continue to work in portions of the facilities during construction. Personnel will perform maintenance, repair and overhaul work on first and second shift. The facility will be turned over to the renovation contractor on third shift. Some short-term negative impact to production is expected. Negative production impact will be mitigated to the extent possible by initiating a production surge prior to beginning construction.

5.18 Alternative Three – New Construction will facilitate the design and implementation of lean cellular manufacturing resulting in step change improvements in production costs. The savings attributed to this alternative are based upon conservative industry benchmarks of benefits achieved with the implementation of lean manufacturing processes.

5.18.1 Direct Labor Benefit: 16.5 percent reduction

5.18.2 Direct Material Benefit: 15 percent reduction

5.18.3 Overhead Benefit: 11.5 percent reduction

6.0 Data Sources

6.1 The real discount rate is 3.1% in accordance with "Discount Rates for Economic Analysis (EA)", revised 9 February 2005, obtained from the AF Portal, SAF/FMC.

6.2 Utility consumption and cost estimates were provided by John Hurd, 72 CES/CECR, DSN 884-5238.

6.3 Personnel costs are calculated based on Schedule of Salary and Wage Rates Locality, Oklahoma City Air Logistics Center, Tinker AFB, OK, dated 12 January 2005.

6.4 Annual maintenance costs, periodic maintenance and repair costs and DD Forms 1391 were provided by Harry Dell, 72 ABW/CEC, DSN 884-5238.

6.5 Historical status quo facility investment costs and Building 3108 deficiency data were provided by Bang Nguyen, OC-ALC/MNPM, DSN 336-7246.

6.6 Status Quo investment costs were extracted from the U.S. Army Corps of Engineers Hazardous Fuel Component Study, Building 3108, and March 1991. Deferred projects were extracted from the study and validated by Mr. Fred Weitelman, Lead Technical Engineer for MAN.

6.7 RCCs, sales rates, efficiency rate, time spent transporting parts and total parts transported per year were provided by Donna Dye, OC-ALC/MNPT, DSN 884-4523.

6.8 Input for the benefit analysis was provided by Mr. Fred Weitelman, Lead Technical Engineer for MAN.

7.0 Summary of the Sensitivity Analyses

7.1 Cost Sensitivity Analyses: The costs (expense items) are key elements of the economic analysis process. The major cost drivers in this analysis are facility, construction and periodic maintenance costs. Sensitivity analyses were performed to determine the impact changes in construction costs, maintenance costs and total costs would have on the analysis results. Results are summarized in the following table:

COST SENSITIVITY ANALYSIS SUMMARY					
#	NO CHANGE	VARIED	COST ELEMENT	RANGE	RANKING REVERSAL
01	Alt 1	Alt 3	Initial Construction	+/-25%	Insensitive within this range
02	Alt 1	Alt 3	Periodic Maintenance	+/-25%	Insensitive within this range

(See Appendix 1 for complete Cost Sensitivity Analysis).

7.2 Discount Rate Sensitivity Analysis: Discount rate sensitivity analysis was performed to determine if the results of the analysis change at different discount rates. A discount rate of 3.1 percent was used in the analysis, and the sensitivity analysis allowed the rate to vary from 2.33 percent to 3.88 percent (+/- 25%). The analysis results are insensitive to changes in the discount rate at all other rates within this range of variation (See Appendix 2 for complete Discount Rate Sensitivity Analysis).

8.0 Summary of the Benefit Analysis

The qualitative benefits that will be realized as a result of the alternatives were identified and assigned a numeric weight between 1 and 5, 1 being the least important, 5 being the most important. A panel of functional experts from the 76th Commodities Maintenance Group, determined the numeric weight. The percentage amount that each alternative meets the objective for each benefit was estimated (100% being the optimum solution, 0% does not meet the objective). The same panel of functional experts determined the percentage. The numeric weight was multiplied by the percentage to arrive at the weighted, individual benefit score for each alternative. The individual benefit scores were then added to determine the total benefit score for each alternative. (See Appendix 3 for complete Benefit Analysis).

BENEFITS	WEIGHT	ALT 1 STATUS QUO (RAW)	ALT 1 (WTD)	ALT 2 RENOVATION OF EXISTING BUILDING (RAW)	ALT 2 (WTD)	ALT 3 CONSTRUCT NEW FACILITY (RAW)	ALT 3 (WTD)
a. Mission Accomplishment	5	50%	2.50	75%	3.75	100%	5.00
b. Accessibility	3	10%	0.30	75%	2.25	100%	3.00
c. Facility Adequacy	3	0%	0.00	50%	1.50	100%	3.00
d. Health/Safety	5	10%	0.50	75%	3.75	95%	4.75
e. Security	5	30%	1.50	50%	2.50	95%	4.75
f. Morale	1	0%	0.00	75%	0.75	100%	1.00
TOTAL SCORES			4.80		14.50		21.50

9.0 Results and Recommendations

ALTERNATIVEs CONSIDERED	NPV	BENEFIT SCORE	COST/ BENEFIT RATIO	SIR	DPP (years)
Status Quo	$ 1,944,131,766	4.80	405,027,451.00	NA	NA
Renovation	$ 1,972,867,266	14.50	136,059,811.00	0.50	NA
New Construction	$ 1,723,349,932	21.50	80,155,811.00	7.30	3.90

Life cycle cost analysis results are presented in the preceding table (See Appendix 4 for Life Cycle Cost Report and Appendices 5-11 for supporting calculations). Alternative One - Status Quo has the next to highest net present value life cycle costs of the three alternatives considered. Status Quo also has the lowest benefit score, resulting in the highest cost/benefit ratio.

Alternative Two - Renovation, is the highest cost alternative in terms of net present value life cycle cost. The alternative yields median values for benefits and cost/benefit ratio, with a SIR of 0.5 to 1. This alternative fails to achieve payback within the analysis period. Additionally, a renovation will not achieve the efficiencies of consolidation, nor does it change the fact that the underlying facilities are over 60 years old and have exceeded their normal useful life.

Alternative Three - New Construction, has the lowest net present value life cycle costs of the three alternatives. New construction also has the highest benefit score resulting in the most favorable cost/benefit ratio of the alternatives considered and yields a SIR of 7.3 to 1. For every dollar of investment, this alternative yields $7.30 in savings, generating sufficient savings to pay for itself in 3.90 years.

The analysis results are insensitive to changes in key cost drivers within a reasonable range of variation (+/- 25%). The analysis results are insensitive to changes in the discount rate between 3.23 and 3.88 percent (+/- 25%).

Alternative Three - New Construction (Project WWYK043008, Consolidated Fuel Overhaul, Test and Repair Facility, is recommended for approval, funding and

implementation. The new facility will provide the optimum environment for the implementation of lean cellular manufacturing practices, which will lead to a step change improvement and will produce substantial savings in direct labor, direct materials and overhead.

COST SENSITIVITY ANALYSIS 1

TITLE: Vary New Const Inv Costs - Alt 1 (SQ) No Change

This sensitivity analysis checks for alternative Status Quo to be ranked least cost as a result of changes in the expense item(s) listed below:

ALTERNATIVE	EXPENSE ITEM(S)
New Construction	Initial Construction
Status Quo	** NOTHING CHANGED **

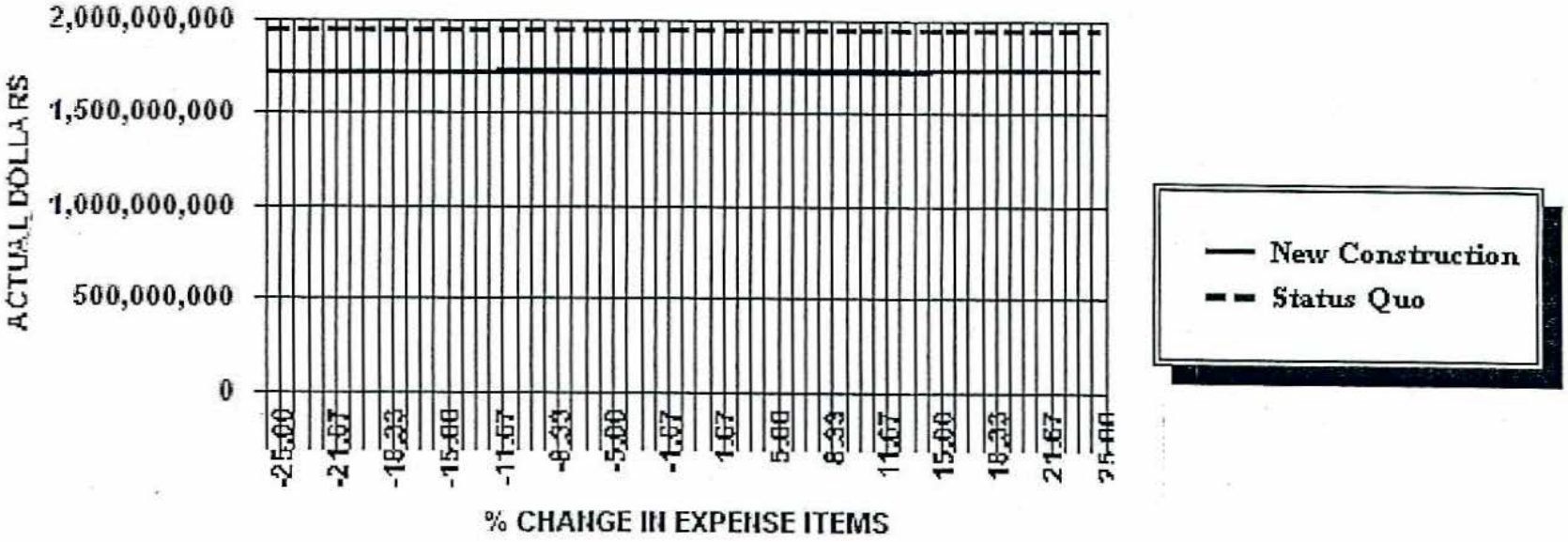
The selected expense items are allowed to vary from a value of -25.00% to 25.00%

ALTERNATIVE	NET PRESENT VALUE
New Construction	$1,723,349,932
Status Quo	$1,944,131,766

RESULTS:

The ranking of alternatives is insensitive to changes in the selected expense item(s), within the allowable range of variation.

COST SENSITIVITY ANALYSIS 1
Vary New Const Inv Costs - Alt 1 (SQ) No Change
Graph of NPV vs. % change in expense items



COST SENSITIVITY ANALYSIS 2

TITLE: Vary SQ Per M&R Costs - Alt 3 No Change

This sensitivity analysis checks for alternative Status Quo to be ranked least cost as a result of changes in the expense item(s) listed below:

ALTERNATIVE	EXPENSE ITEM(S)
Status Quo	Periodic Maintenance
New Construction	** NOTHING CHANGED **

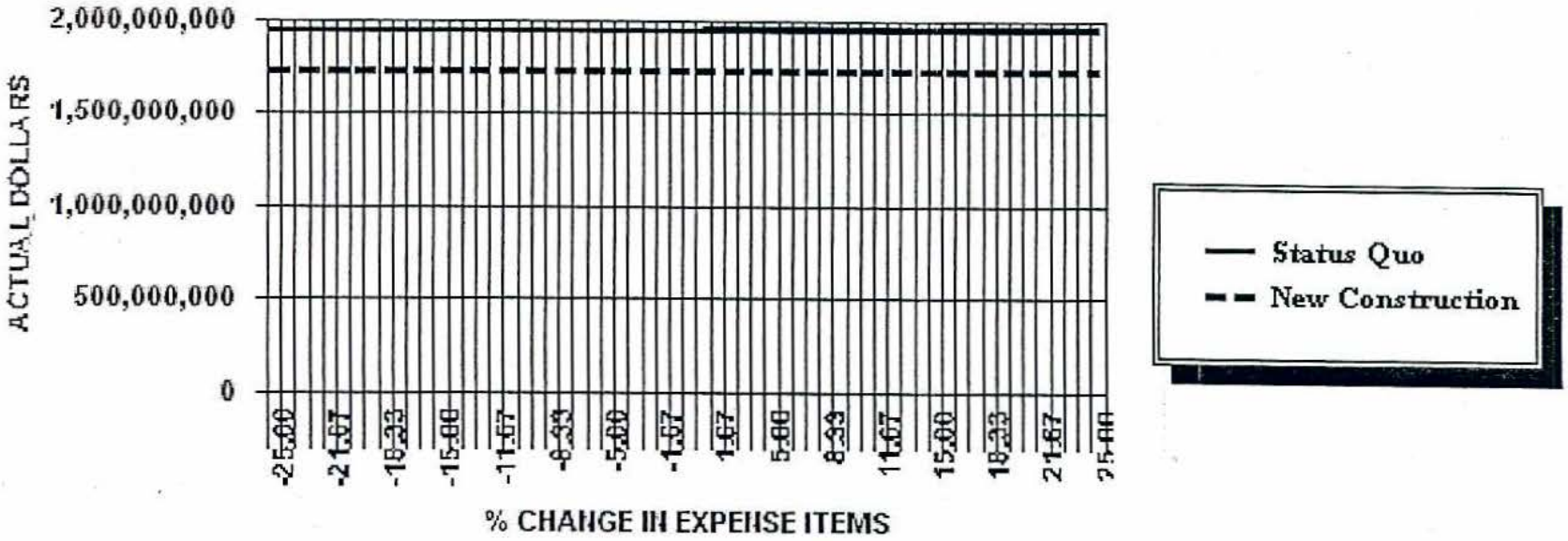
The selected expense items are allowed to vary from a value of -25.00% to 25.00%

ALTERNATIVE	NET PRESENT VALUE
New Construction	$1,723,349,932
Status Quo	$1,944,131,766

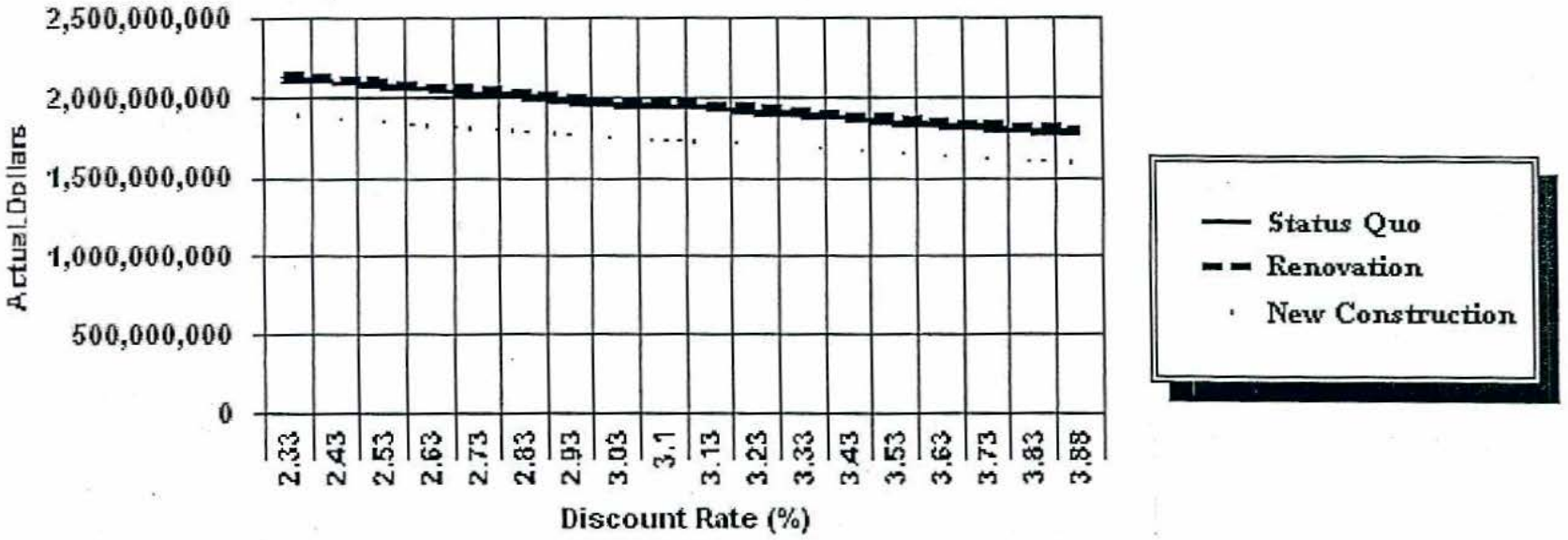
RESULTS:

The ranking of alternatives is insensitive to changes in the selected expense item(s), within the allowable range of variation.

COST SENSITIVITY ANALYSIS 2
Vary SQ Per M&R Costs - Alt 3 No Change
Graph of NPV vs. % change in expense items



DISCOUNT RATE SENSITIVITY ANALYSIS 1
Vary Discount Rate +/- 25%
Graph of Net Present Value vs. Discount Rate



DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Vary Discount Rate +/- 25%

No changes in alternative ranking occurred

Table of Net Present Value for each Discount Rate

Discount Rate = 02.33%		Discount Rate = 02.43%	
New Construction	- $1,881,441,4	New Construction	- $1,859,660,2
Status Quo	- $2,129,569,1	Status Quo	- $2,104,009,7
Renovation	- $2,156,595,2	Renovation	- $2,130,913,4
Discount Rate = 02.53%		**Discount Rate = 02.63%**	
New Construction	- $1,838,267,2	New Construction	- $1,817,254,4
Status Quo	- $2,078,909,1	Status Quo	- $2,054,257,6
Renovation	- $2,105,693,4	Renovation	- $2,080,925,2
Discount Rate = 02.73%		**Discount Rate = 02.83%**	
New Construction	- $1,796,613,6	New Construction	- $1,776,336,9
Status Quo	- $2,030,045,6	Status Quo	- $2,006,263,9
Renovation	- $2,056,599,2	Renovation	- $2,032,706,1
Discount Rate = 02.93%		**Discount Rate = 03.03%**	
New Construction	- $1,756,416,9	New Construction	- $1,736,845,8
Status Quo	- $1,982,903,3	Status Quo	- $1,959,954,9
Renovation	- $2,009,236,7	Renovation	- $1,986,182,0
Discount Rate = 03.10%		**Discount Rate = 03.13%**	
New Construction	- $1,723,349,9	New Construction	- $1,717,616,6
Status Quo	- $1,944,131,7	Status Quo	- $1,937,410,1
Renovation	- $1,970,285,9	Renovation	- $1,963,533,4
Discount Rate = 03.23%		**Discount Rate = 03.33%**	
New Construction	- $1,698,721,9	New Construction	- $1,680,154,8
Status Quo	- $1,915,260,4	Status Quo	- $1,893,497,5
Renovation	- $1,941,282,2	Renovation	- $1,919,420,2
Discount Rate = 03.43%		**Discount Rate = 03.53%**	
New Construction	- $1,661,908,6	New Construction	- $1,643,976,6
Status Quo	- $1,872,113,4	Status Quo	- $1,851,100,1
Renovation	- $1,897,939,2	Renovation	- $1,876,831,2
Discount Rate = 03.63%		**Discount Rate = 03.73%**	
New Construction	- $1,626,352,3	New Construction	- $1,609,029,2
Status Quo	- $1,830,449,9	Status Quo	- $1,810,155,3
Renovation	- $1,856,088,5	Renovation	- $1,835,703,6
Discount Rate = 03.83%		**Discount Rate = 03.88%**	
New Construction	- $1,592,001,4	New Construction	- $1,583,596,2
Status Quo	- $1,790,209,0	Status Quo	- $1,780,364,2
Renovation	- $1,815,668,9	Renovation	- $1,805,780,7

SOURCE DERIVATION OF BENEFITS AND COSTS

BENEFIT ANALYSIS

The qualitative benefits that will be realized as a result of the alternatives were identified and assigned a numeric weight between 1 and 5, 1 being the least important, 5 being the most important. I worked with Mr. Fred Weitelman, Lead Technical Engineer for MAN, to determine the numeric weight. The percentage amount that each alternative meets the objective for each benefit was estimated (100% being the optimum solution, 0% does not meet the objective). The numeric weight was multiplied by the percentage to arrive at the weighted, individual benefit score for each alternative. The individual benefit scores were then added to determine the total benefit score for each alternative.

Benefit Definitions and Ranking:

Benefits are rated based on importance. Below are the definitions of each of the benefits with the corresponding ranking in parentheses.

a. Mission Accomplishment: measures the extent to which the alternative has a positive impact on the 76th Commodities Maintenance Group's mission accomplishment. (5)

b. Accessibility: evaluates the extent to which the facility in a given alternative is accessible to 76th Commodities Maintenance Group handicapped and physically challenged personnel. (3)

c. Facility Adequacy: assesses the extent to which an alternative meets the facility needs of the 76th Commodities Maintenance Group. (3)

d. Health/Safety: measures the degree to which the alternative promotes health and safety of 76th Commodities Maintenance Group personnel . (5)

e. Security: measures the extent to which an alternative enables the 76th Commodities Maintenance Group to protect the resources and personnel it houses. (5)

f. Morale: measures the extent to which the alternative has a positive impact on morale. (1)

SOURCE DERIVATION OF BENEFITS AND COSTS

The results of the benefit analysis are summarized in the following table:

BENEFITS	WEIGHT	ALT 1 STATUS QUO (RAW)	ALT 1 (WTD)	ALT 2 RENOVATION OF EXISTING BUILDING (RAW)	ALT 2 (WTD)	ALT 3 CONSTRUCT NEW FACILITY (RAW)	ALT 3 (WTD)
a. Mission Accomplishment	5	50%	2.50	75%	3.75	100%	5.00
b. Accessibility	3	10%	0.30	75%	2.25	100%	3.00
c. Facility Adequacy	3	0%	0.00	50%	1.50	100%	3.00
d. Health/Safety	5	10%	0.50	75%	3.75	95%	4.75
e. Security	5	30%	1.50	50%	2.50	95%	4.75
f. Morale	1	0%	0.00	75%	0.75	100%	1.00
TOTAL SCORES			4.80		14.50		21.50

Scoring Rationale:

a. Mission Accomplishment: Alternative 1 is rated 50% for this benefit. Although the mission is being satisfactorily performed, the poor layout, excessive travel time for parts and personnel, and degraded facility condition are detrimental to efficient and effective mission accomplishment. Alternative 2 rates somewhat better at 75%, by correcting documented facility deficiencies. However, alternative 2 does not eliminate the need to transport commodity items between buildings. Alternative 3 is scored 100% for this benefit, because it provides the optimum conditions for efficiency by providing a new facility, which can be custom configured for the workload it houses, incorporating the most up to date industrial production methods. Additionally, the new facility will be located adjacent to Building 3902, thereby eliminating the need to transport commodity items over long distances.

b. Accessibility: Alternative 1 earns a score of 10% for accessibility, as there are no external ramps to provide grade level accessibility for handicapped workers. There is also no elevator to permit handicapped access of second floor administrative work areas. Alternative 2 will substantially improve accessibility through the renovation, but will not achieve total accessibility due to the need to reconfigure existing space. Alternative 3 will provide a totally accessible facility by incorporating modern standards into the design, and is therefore scored 100%.

c. Facility Adequacy: A 1991 Corps of Engineers Hazardous Component Study documented the seriously degraded condition of the Building 3108. Despite maintenance and repair expenditures totaling over $15.5 million over the past seven years, this amount of funding was only enough to resolve the most urgent and critical deficiencies. These "band-aid" fixes are a drain on scarce maintenance and repair resources, while still leaving OC-ALC with a facility in generally poor condition. Accordingly, Alternative 1 is rated 0% for this benefit. Alternative 2 is rated 75% for facility adequacy, as the renovation will resolve many of the long standing and serious Life Safety and Uniform Building Code deficiencies. However, the age and configuration of the underlying facility will constrain design and layout. Alternative 3 will provide a newly constructed

facility specifically designed and laid out for the workload it will house, providing the optimum environment for the commodities workload. This "best case" facility scenario is rated 100% for this benefit.

d. Health/Safety: The 1991 Corps of Engineers Hazardous Component Study documented numerous deficiencies in Building 3108 in violation of the Uniform Building Code, Uniform Fire Code, Life Safety Code (NFPA 101), Flammable and Combustible Liquids Code (NFPA 30), and National Electrical Code. Although several million dollars have been invested to correct the deficiencies causing the greatest risk to life and property, the work was not sufficient to completely restore the building to an acceptable condition meeting all code requirements. Alternative 1 was rated 10% for this benefit because the facility is not conducive to the health and safety of its occupants. Alternative 2 meets this benefit 75%, as it will significantly improve the health and safety factors of the facility, due to the extensive renovation and remediation of all code deficiencies. Alternative 3 is scored 95%, as it will provide a new facility, constructed to modern standards, which will provide the best possible environment to promote the health and safety of the personnel who work there.

e. Security: Alternative 1 is rated 30% for security. Building 3108, as currently configured, lacks standard design features which would improve the security environment. There is no central entry for visitor check-in and exterior doors lead directly to interior work areas. Exterior doors are rarely locked during duty hours, and some are not lockable at all. The lack of central corridors makes it impossible to secure equipment from the general population when not in use. The extensive renovation called for in Alternative 2 will correct many security issues; however, the need to for commodities and personnel to travel between facilities creates a potential security risk. This potential risk justifies the score of 50% for this benefit. Alternative 3 will provide a facility designed to incorporate the security features necessary in a post-9/11 environment, earning a score of 95%.

f. Morale: Alternative 1 scores 0% for the morale benefit. Employees work in a cramped, poorly lit, degraded facility. Climate control is poor to non-existent. An uncomfortable and unattractive work environment is not conducive to high morale. Alternative 2 is rated 75% for this benefit, as the renovation will substantially improve the work environment, with a correspondingly favorable impact on morale. Alternative 3 is scored 100% for this benefit. An attractive, well-designed and comfortable facility will have the maximum positive impact on employee morale.

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Consolidated Fuel Test Repair and Overhaul Final
ECONOMIC ANALYSIS

EXECUTIVE SUMMARY REPORT

PROJECT TITLE : WWYK043008
DISCOUNT RATE : 3.1%
PERIOD OF ANALYSIS : 28 Years
START YEAR : 2008
BASE YEAR : 2008
REPORT OUTPUT : Constant Dollars

PROJECT OBJECTIVE:

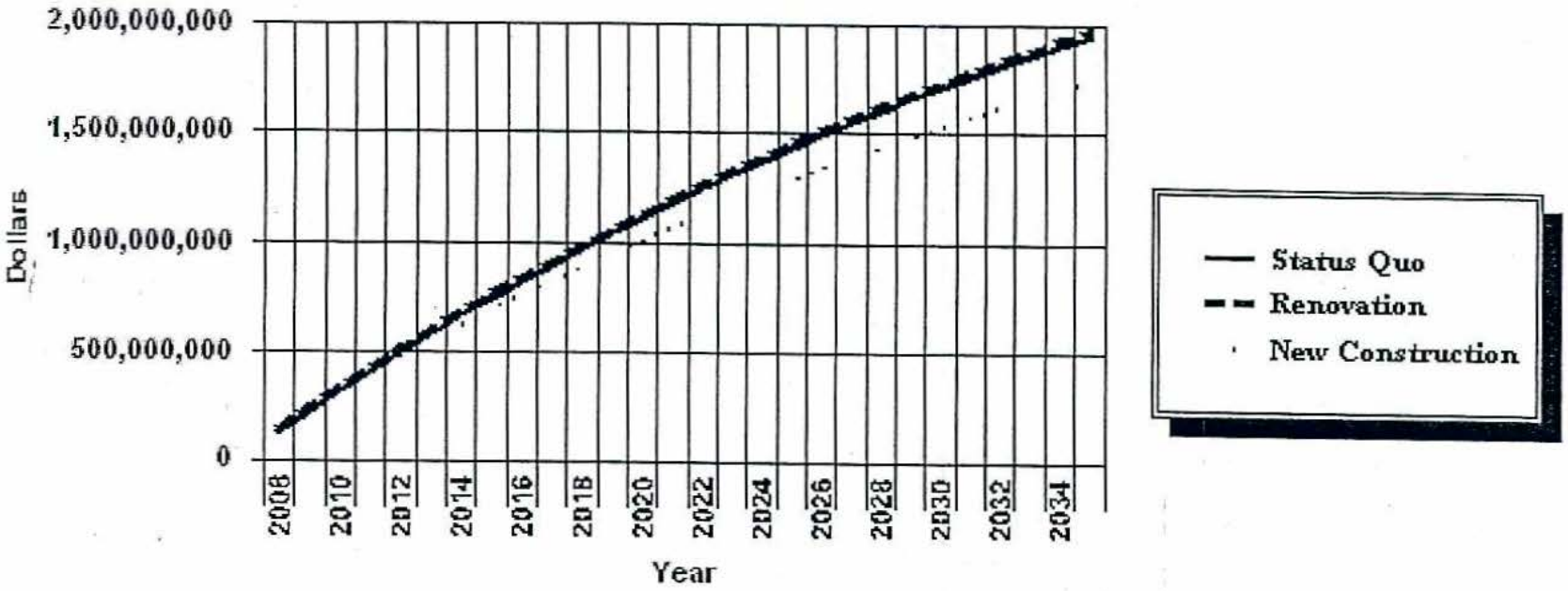
Determine the most cost effective means to provide 140,000 sq.ft of industrial space for the fuel control test, repair and overhaul function.

ECONOMIC INDICATORS:

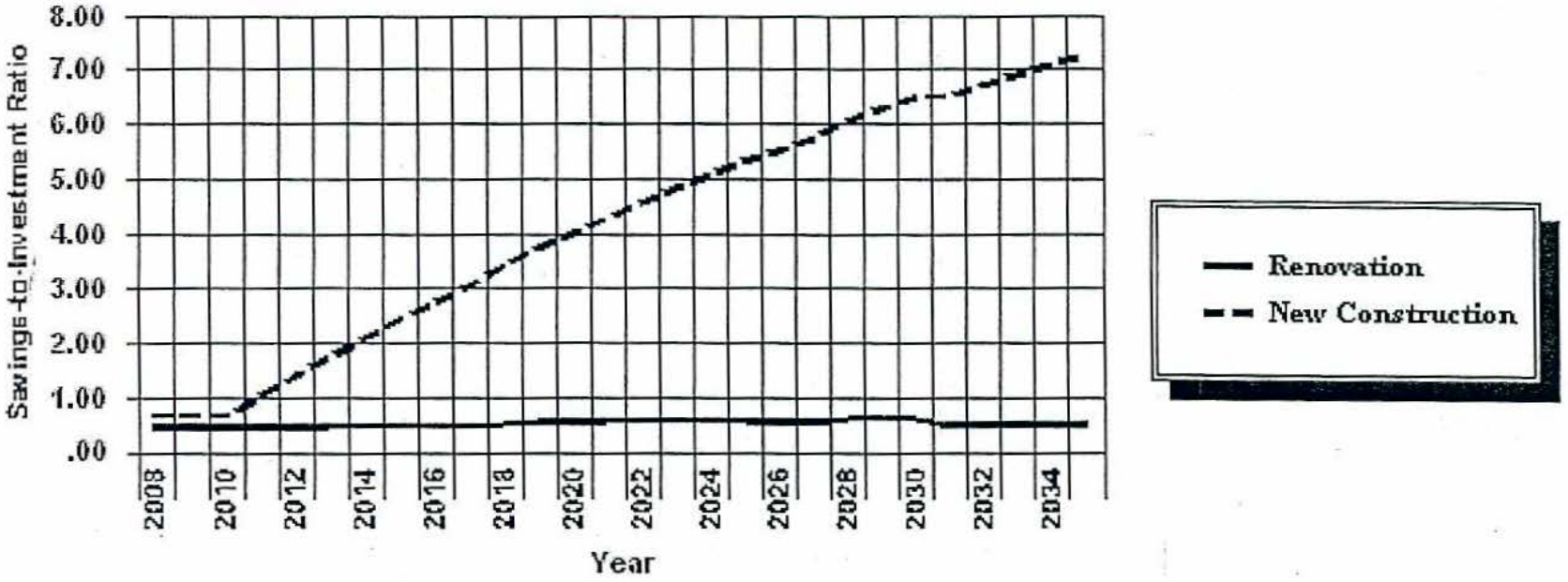
ALTERNATIVE NAME	NPV	SIR	DPP	BIR
Status Quo	$1,944,131,766	N/A	N/A	N/A
Renovation	$1,970,285,926	0.5	N/A	N/A
New Construction	$1,723,349,932	7.3	3.9 YEARS	N/A

ACTION OFFICER: Deborah Tomlinson
PHONE NUMBER : (405) 739-7373
EMAIL ADDRESS : deborah.tomlinson@tinker.af.mil
ORGANIZATION : OC-ALC/FMC

ECONOMIC ANALYSIS GRAPH 1
Cumulative Net Present Value



SIR ECONOMIC ANALYSIS GRAPH 1
SIR Vs. Years



LIFE CYCLE COST REPORT

Status Quo

YEAR	Transportation Time (1)	Annual Maintenance (2)	Periodic Maintenance (3)	Utilities (4)	Equipment Recapitaliza (5)
2008	$42,413	$258,626	$7,622,942	$44,305	$7,536,000
2009	$42,413	$258,626	$0	$44,305	$0
2010	$42,413	$258,626	$0	$44,305	$0
2011	$42,413	$258,626	$0	$44,305	$0
2012	$42,413	$258,626	$0	$44,305	$0
2013	$42,413	$258,626	$0	$44,305	$0
2014	$42,413	$258,626	$0	$44,305	$0
2015	$42,413	$258,626	$0	$44,305	$0
2016	$42,413	$258,626	$0	$44,305	$0
2017	$42,413	$258,626	$0	$44,305	$0
2018	$42,413	$258,626	$3,311,446	$44,305	$0
2019	$42,413	$258,626	$1,924,116	$44,305	$0
2020	$42,413	$258,626	$0	$44,305	$0
2021	$42,413	$258,626	$3,776,969	$44,305	$0
2022	$42,413	$258,626	$0	$44,305	$0
2023	$42,413	$258,626	$199,589	$44,305	$0
2024	$42,413	$258,626	$0	$44,305	$0
2025	$42,413	$258,626	$0	$44,305	$0
2026	$42,413	$258,626	$0	$44,305	$0
2027	$42,413	$258,626	$0	$44,305	$0
2028	$42,413	$258,626	$6,603,822	$44,305	$0
2029	$42,413	$258,626	$0	$44,305	$0
2030	$42,413	$258,626	$0	$44,305	$0
2031	$42,413	$258,626	$0	$44,305	$0
2032	$42,413	$258,626	$0	$44,305	$0
2033	$42,413	$258,626	$0	$44,305	$0
2034	$42,413	$258,626	$0	$44,305	$0
2035	$42,413	$258,626	$0	$44,305	$0
%NPV	0.04	0.25	0.90	0.04	0.38
	$798,292	$4,867,827	$17,422,494	$833,903	$7,421,839
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	Investment Costs

LIFE CYCLE COST REPORT

Status Quo

YEAR	Direct Labor (6)	Direct Material (7)	Overhead (8)	COE Recommended Repair (9)	TOTAL ANNUAL OUTLAYS
2008	$15,871,531	$58,100,642	$27,249,176	$7,728,598	$124,454,233
2009	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2010	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2011	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2012	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2013	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2014	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2015	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2016	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2017	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2018	$15,871,531	$58,100,642	$27,249,176	$0	$104,878,139
2019	$15,871,531	$58,100,642	$27,249,176	$0	$103,490,809
2020	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2021	$15,871,531	$58,100,642	$27,249,176	$0	$105,343,662
2022	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2023	$15,871,531	$58,100,642	$27,249,176	$0	$101,766,282
2024	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2025	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2026	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2027	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2028	$15,871,531	$58,100,642	$27,249,176	$0	$108,170,515
2029	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2030	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2031	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2032	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2033	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2034	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2035	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
%NPV	15.37	56.25	26.38	0.39	
	$298,732,021	$1,093,563,200	$512,880,668	$7,611,520	
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Investment Costs	

LIFE CYCLE COST REPORT

Status Quo

YEAR	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2008	0.985	$122,568,915	$122,568,915
2009	0.955	$97,020,457	$219,589,371
2010	0.927	$94,103,256	$313,692,627
2011	0.899	$91,273,769	$404,966,396
2012	0.872	$88,529,359	$493,495,754
2013	0.845	$85,867,467	$579,363,222
2014	0.820	$83,285,613	$662,648,835
2015	0.795	$80,781,390	$743,430,225
2016	0.771	$78,352,464	$821,782,689
2017	0.748	$75,996,570	$897,779,259
2018	0.726	$76,114,778	$973,894,037
2019	0.704	$72,849,593	$1,046,743,630
2020	0.683	$69,345,454	$1,116,089,084
2021	0.662	$69,761,600	$1,185,850,684
2022	0.642	$65,238,004	$1,251,088,688
2023	0.623	$63,400,779	$1,314,489,467
2024	0.604	$61,373,845	$1,375,863,313
2025	0.586	$59,528,463	$1,435,391,776
2026	0.568	$57,738,567	$1,493,130,343
2027	0.551	$56,002,490	$1,549,132,833
2028	0.535	$57,850,386	$1,606,983,219
2029	0.519	$52,685,367	$1,659,668,586
2030	0.503	$51,101,229	$1,710,769,815
2031	0.488	$49,564,722	$1,760,334,537
2032	0.473	$48,074,415	$1,808,408,953
2033	0.459	$46,628,919	$1,855,037,872
2034	0.445	$45,226,886	$1,900,264,757
2035	0.432	$43,867,008	$1,944,131,766

3.1% DISCOUNT RATE, 28 YEARS

Renovation

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communica-tions (3)	Transportation Time (4)	Annual Maintenance (5)
2008	$45,500,000	$0	$1,464,000	$42,413	$258,626
2009	$0	$0	$0	$42,413	$258,626
2010	$0	$0	$0	$42,413	$258,626
2011	$0	$0	$0	$42,413	$0
2012	$0	$0	$0	$42,413	$81,083
2013	$0	$0	$0	$42,413	$81,083
2014	$0	$0	$0	$42,413	$81,083
2015	$0	$0	$0	$42,413	$81,083
2016	$0	$0	$0	$42,413	$81,083

LIFE CYCLE COST REPORT

Renovation

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communica-tions (3)	Transportation Time (4)	Annual Maintenance (5)
2008	$45,500,000	$0	$1,464,000	$42,413	$258,626
2009	$0	$0	$0	$42,413	$258,626
2010	$0	$0	$0	$42,413	$258,626
2011	$0	$0	$0	$42,413	$0
2012	$0	$0	$0	$42,413	$81,083
2013	$0	$0	$0	$42,413	$81,083
2014	$0	$0	$0	$42,413	$81,083
2015	$0	$0	$0	$42,413	$81,083
2016	$0	$0	$0	$42,413	$81,083
2017	$0	$0	$0	$42,413	$81,083
2018	$0	$0	$0	$42,413	$81,083
2019	$0	$0	$0	$42,413	$81,083
2020	$0	$0	$0	$42,413	$81,083
2021	$0	$0	$0	$42,413	$81,083
2022	$0	$7,536,000	$0	$42,413	$113,516
2023	$0	$0	$0	$42,413	$113,516
2024	$0	$0	$0	$42,413	$113,516
2025	$0	$0	$0	$42,413	$113,516
2026	$0	$0	$0	$42,413	$113,516
2027	$0	$0	$0	$42,413	$113,516
2028	$0	$0	$0	$42,413	$113,516
2029	$0	$0	$0	$42,413	$113,516
2030	$0	$0	$0	$42,413	$113,516
2031	$0	$0	$0	$42,413	$154,058
2032	$0	$0	$0	$42,413	$154,058
2033	$0	$0	$0	$42,413	$154,058
2034	$0	$0	$0	$42,413	$154,058
2035	$0	$0	$0	$42,413	$154,058
%NPV	2.27	0.25	0.07	0.04	0.12
	$44,810,735	$4,840,500	$1,441,822	$798,292	$2,296,337
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Investment Costs	Investment Costs	Investment Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

Renovation

YEAR	Periodic Maintenance (6)	Utilities (7)	Direct Labor (8)	Direct Material (9)	Overhead (10)
2008	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2009	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2010	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2011	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2012	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2013	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2014	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2015	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2016	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2017	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2018	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2019	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2020	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2021	$3,311,446	$39,986	$15,871,531	$58,100,642	$27,249,176
2022	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2023	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2024	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2025	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2026	$3,420,651	$39,986	$15,871,531	$58,100,642	$27,249,176
2027	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2028	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2029	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2030	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2031	$12,304,907	$39,986	$15,871,531	$58,100,642	$27,249,176
2032	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2033	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2034	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2035	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
%NPV	0.51	0.04	15.16	55.50	26.03
	$10,142,320	$780,031	$298,732,021	$1,093,563,200	$512,880,668
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

Renovation

YEAR	TOTAL ANNUAL OUTLAYS	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2008	$148,530,693	0.985	$146,280,648	$146,280,648
2009	$101,566,693	0.955	$97,020,457	$243,301,104
2010	$101,566,693	0.927	$94,103,256	$337,404,360
2011	$101,306,363	0.899	$91,039,821	$428,444,181
2012	$101,387,446	0.872	$88,373,120	$516,817,301
2013	$101,387,446	0.845	$85,715,927	$602,533,228
2014	$101,387,446	0.820	$83,138,629	$685,671,857
2015	$101,387,446	0.795	$80,638,825	$766,310,682
2016	$101,387,446	0.771	$78,214,186	$844,524,868
2017	$101,387,446	0.748	$75,862,450	$920,387,318
2018	$101,384,831	0.726	$73,579,528	$993,966,846
2019	$101,384,831	0.704	$71,367,146	$1,065,333,992
2020	$101,384,831	0.683	$69,221,286	$1,134,555,278
2021	$104,696,277	0.662	$69,332,883	$1,203,888,161
2022	$108,953,264	0.642	$69,982,524	$1,273,870,684
2023	$101,417,264	0.623	$63,183,340	$1,337,054,024
2024	$101,417,264	0.604	$61,283,550	$1,398,337,574
2025	$101,417,264	0.586	$59,440,882	$1,457,778,456
2026	$104,837,915	0.568	$59,598,190	$1,517,376,646
2027	$101,417,264	0.551	$55,920,097	$1,573,296,743
2028	$101,417,264	0.535	$54,238,698	$1,627,535,440
2029	$101,417,264	0.519	$52,607,854	$1,680,143,294
2030	$101,417,264	0.503	$51,026,047	$1,731,169,341
2031	$113,762,713	0.488	$55,516,401	$1,786,685,742
2032	$101,457,806	0.473	$48,022,876	$1,834,708,618
2033	$101,457,806	0.459	$46,578,929	$1,881,287,548
2034	$101,457,806	0.445	$45,178,399	$1,926,465,947
2035	$101,457,806	0.432	$43,819,980	$1,970,285,926

3.1% DISCOUNT RATE, 28 YEARS

2015	$101,566,693	$101,387,446	$179,247	0.795	$142,565
2016	$101,566,693	$101,387,446	$179,247	0.771	$138,278

PRIMARY ECONOMIC ANALYSIS

Status Quo Alternative: Status Quo
Proposed Alternative : Renovation

Project Year(s)	Recurring Annual Operating Costs Status Quo Alternative	Proposed Alternative	Differential Costs	Present Value Factor	Present Value of Differential Costs
2008	$109,189,635	$101,566,693	$7,622,942	0.985	$7,507,464
2009	$101,566,693	$101,566,693	$0	0.955	$0
2010	$101,566,693	$101,566,693	$0	0.927	$0
2011	$101,566,693	$101,306,363	$260,330	0.899	$233,948
2012	$101,566,693	$101,387,446	$179,247	0.872	$156,238
2013	$101,566,693	$101,387,446	$179,247	0.845	$151,541
2014	$101,566,693	$101,387,446	$179,247	0.820	$146,984
2015	$101,566,693	$101,387,446	$179,247	0.795	$142,565
2016	$101,566,693	$101,387,446	$179,247	0.771	$138,278
2017	$101,566,693	$101,387,446	$179,247	0.748	$134,120
2018	$104,878,139	$101,384,831	$3,493,308	0.726	$2,535,251
2019	$103,490,809	$101,384,831	$2,105,978	0.704	$1,482,447
2020	$101,566,693	$101,384,831	$181,862	0.683	$124,168
2021	$105,343,662	$104,696,277	$647,385	0.662	$428,717
2022	$101,566,693	$101,417,264	$149,429	0.642	$95,981
2023	$101,766,282	$101,417,264	$349,018	0.623	$217,440
2024	$101,566,693	$101,417,264	$149,429	0.604	$90,296
2025	$101,566,693	$101,417,264	$149,429	0.586	$87,581
2026	$101,566,693	$104,837,915	-$3,271,222	0.568	-$1,859,622
2027	$101,566,693	$101,417,264	$149,429	0.551	$82,393
2028	$108,170,515	$101,417,264	$6,753,251	0.535	$3,611,688
2029	$101,566,693	$101,417,264	$149,429	0.519	$77,513
2030	$101,566,693	$101,417,264	$149,429	0.503	$75,182
2031	$101,566,693	$113,762,713	-$12,196,020	0.488	-$5,951,679
2032	$101,566,693	$101,457,806	$108,887	0.473	$51,539
2033	$101,566,693	$101,457,806	$108,887	0.459	$49,990
2034	$101,566,693	$101,457,806	$108,887	0.445	$48,487
2035	$101,566,693	$101,457,806	$108,887	0.432	$47,029
Totals	$2,867,306,288	$2,858,951,852	$8,354,436		$9,905,537

PRIMARY ECONOMIC ANALYSIS

Total present value of investment	$51,093,057
Plus: present value of existing assets to be used	$0
Less: present value of existing assets replaced	$0
Less: present value of proposed alternative salvage value	$0
Total present value of net investment	$51,093,057
Total present value of differential costs	$9,905,537
Plus: present value of status quo investment costs eliminated	$15,033,359
Less: present value of status quo salvage value	$0
Total present value of savings	$24,938,896
Savings/Investment Ratio	0.5

SIR is less than one at end of period of analysis

For Status Quo:

Recurring Costs:
- Transportation Time
- Annual Maintenance
- Periodic Maintenance
- Utilities
- Direct Labor
- Direct Material
- Overhead

Investment Costs:
- Equipment Recapitalization
- COE Recommended Repair

For Proposed Alternative:

Recurring Costs:
- Transportation Time
- Annual Maintenance
- Periodic Maintenance
- Utilities
- Direct Labor
- Direct Material
- Overhead

Investment Costs:
- Initial Construction
- Initial Operating Equipment
- Communica- tions

LIFE CYCLE COST REPORT

New Construction

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communica-tions (3)	Utilities (4)	Annual Maintenance (5)
2008	$35,000,000	$7,536,000	$1,464,000	$44,305	$258,626
2009	$0	$0	$0	$44,305	$258,626
2010	$0	$0	$0	$44,305	$258,626
2011	$0	$0	$0	$40,822	$0
2012	$0	$0	$0	$40,822	$86,383
2013	$0	$0	$0	$40,822	$86,383
2014	$0	$0	$0	$40,822	$86,383
2015	$0	$0	$0	$40,822	$86,383
2016	$0	$0	$0	$40,822	$86,383
2017	$0	$0	$0	$40,822	$86,383
2018	$0	$0	$0	$40,822	$86,383
2019	$0	$0	$0	$40,822	$86,383
2020	$0	$0	$0	$40,822	$86,383
2021	$0	$0	$0	$40,822	$86,383
2022	$0	$0	$0	$40,822	$120,936
2023	$0	$0	$0	$40,822	$120,936
2024	$0	$0	$0	$40,822	$120,936
2025	$0	$0	$0	$40,822	$120,936
2026	$0	$0	$0	$40,822	$120,936
2027	$0	$0	$0	$40,822	$120,936
2028	$0	$0	$0	$40,822	$120,936
2029	$0	$0	$0	$40,822	$120,936
2030	$0	$0	$0	$40,822	$120,936
2031	$0	$0	$0	$40,822	$164,128
2032	$0	$0	$0	$40,822	$164,128
2033	$0	$0	$0	$40,822	$164,128
2034	$0	$0	$0	$40,822	$164,128
2035	$0	$0	$0	$40,822	$164,128
%NPV	2.00	0.43	0.08	0.05	0.14
	$34,469,796	$7,421,839	$1,441,822	$778,331	$2,397,977
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Investment Costs	Investment Costs	Investment Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

New Construction

YEAR	Periodic Maintenance (6)	Direct Labor (7)	Direct Material (8)	Overhead (9)	TOTAL ANNUAL OUTLAYS
2008	$0	$15,871,531	$58,100,642	$27,249,176	$145,524,280
2009	$0	$15,871,531	$58,100,642	$27,249,176	$101,524,280
2010	$0	$15,871,531	$58,100,642	$27,249,176	$101,524,280
2011	$0	$13,252,728	$49,385,546	$24,115,521	$86,794,617
2012	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2013	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2014	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2015	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2016	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2017	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2018	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2019	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2020	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2021	$3,477,873	$13,252,728	$49,385,546	$24,115,521	$90,358,873
2022	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2023	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2024	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2025	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2026	$3,574,468	$13,252,728	$49,385,546	$24,115,521	$90,490,021
2027	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2028	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2029	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2030	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2031	$12,875,746	$13,252,728	$49,385,546	$24,115,521	$99,834,491
2032	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2033	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2034	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2035	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
%NPV	0.62	14.91	55.39	26.86	
	$10,618,545	$256,948,310	$954,511,481	$462,882,354	
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	

YEAR	DISCOUNT FACTORS	VALUE	VALUE	(1)	VALUE
2008	0.985	$143,319,778	$143,319,778	$0	$143,319,778
2009	0.955	$96,979,942	$240,299,720	$0	$240,299,720

LIFE CYCLE COST REPORT

New Construction

YEAR	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE PRESENT VALUE	Residual Value (1)	CUMULATIVE NET PRESENT VALUE
2008	0.985	$143,319,778	$143,319,778	$0	$143,319,778
2009	0.955	$96,979,942	$240,299,720	$0	$240,299,720
2010	0.927	$94,063,959	$334,363,679	$0	$334,363,679
2011	0.899	$77,998,718	$412,362,397	$30,413,364	$381,949,033
2012	0.872	$75,728,755	$488,091,152	$28,952,620	$459,138,532
2013	0.845	$73,451,751	$561,542,903	$27,552,226	$533,990,677
2014	0.820	$71,243,211	$632,786,114	$26,209,870	$606,576,244
2015	0.795	$69,101,078	$701,887,192	$24,923,328	$676,963,864
2016	0.771	$67,023,354	$768,910,546	$23,690,458	$745,220,088
2017	0.748	$65,008,103	$833,918,648	$22,509,194	$811,409,454
2018	0.726	$63,053,446	$896,972,094	$21,377,549	$875,594,545
2019	0.704	$61,157,561	$958,129,656	$20,293,604	$937,836,051
2020	0.683	$59,318,682	$1,017,448,338	$19,255,518	$998,192,820
2021	0.662	$59,838,242	$1,077,286,580	$18,261,511	$1,059,025,068
2022	0.642	$55,827,329	$1,133,113,909	$17,309,871	$1,115,804,037
2023	0.623	$54,148,719	$1,187,262,628	$16,398,949	$1,170,863,678
2024	0.604	$52,520,581	$1,239,783,208	$15,527,155	$1,224,256,054
2025	0.586	$50,941,398	$1,290,724,606	$14,692,962	$1,276,031,644
2026	0.568	$51,441,708	$1,342,166,314	$13,894,896	$1,328,271,418
2027	0.551	$47,924,051	$1,390,090,366	$13,131,540	$1,376,958,826
2028	0.535	$46,483,076	$1,436,573,441	$12,401,526	$1,424,171,916
2029	0.519	$45,085,428	$1,481,658,869	$11,703,538	$1,469,955,331
2030	0.503	$43,729,804	$1,525,388,673	$11,036,315	$1,514,352,358
2031	0.488	$48,719,405	$1,574,108,078	$10,398,634	$1,563,709,444
2032	0.473	$41,160,057	$1,615,268,134	$9,789,323	$1,605,478,811
2033	0.459	$39,922,460	$1,655,190,595	$9,207,252	$1,645,983,342
2034	0.445	$38,722,076	$1,693,912,671	$8,651,335	$1,685,261,336
2035	0.432	$37,557,785	$1,731,470,456	$8,120,523	$1,723,349,932

%NPV				-0.47	
				$8,120,523	
DISCOUNTING CONVENTION				E-O-Y	
INFLATION INDEX				No Inflation	
			Straight Line		

3.1% DISCOUNT RATE, 28 YEARS

PRIMARY ECONOMIC ANALYSIS

Status Quo Alternative: Status Quo
Proposed Alternative : New Construction

Project Year(s)	Recurring Annual Operating Costs Status Quo Alternative	Proposed Alternative	Differential Costs	Present Value Factor	Present Value of Differential Costs
2008	$109,189,635	$101,524,280	$7,665,355	0.985	$7,549,235
2009	$101,566,693	$101,524,280	$42,413	0.955	$40,515
2010	$101,566,693	$101,524,280	$42,413	0.927	$39,296
2011	$101,566,693	$86,794,617	$14,772,076	0.899	$13,275,051
2012	$101,566,693	$86,881,000	$14,685,693	0.872	$12,800,604
2013	$101,566,693	$86,881,000	$14,685,693	0.845	$12,415,716
2014	$101,566,693	$86,881,000	$14,685,693	0.820	$12,042,402
2015	$101,566,693	$86,881,000	$14,685,693	0.795	$11,680,312
2016	$101,566,693	$86,881,000	$14,685,693	0.771	$11,329,110
2017	$101,566,693	$86,881,000	$14,685,693	0.748	$10,988,467
2018	$104,878,139	$86,881,000	$17,997,139	0.726	$13,061,333
2019	$103,490,809	$86,881,000	$16,609,809	0.704	$11,692,032
2020	$101,566,693	$86,881,000	$14,685,693	0.683	$10,026,772
2021	$105,343,662	$90,358,873	$14,984,789	0.662	$9,923,358
2022	$101,566,693	$86,915,553	$14,651,140	0.642	$9,410,675
2023	$101,766,282	$86,915,553	$14,850,729	0.623	$9,252,060
2024	$101,566,693	$86,915,553	$14,651,140	0.604	$8,853,265
2025	$101,566,693	$86,915,553	$14,651,140	0.586	$8,587,066
2026	$101,566,693	$90,490,021	$11,076,672	0.568	$6,296,859
2027	$101,566,693	$86,915,553	$14,651,140	0.551	$8,078,439
2028	$108,170,515	$86,915,553	$21,254,962	0.535	$11,367,310
2029	$101,566,693	$86,915,553	$14,651,140	0.519	$7,599,939
2030	$101,566,693	$86,915,553	$14,651,140	0.503	$7,371,425
2031	$101,566,693	$99,834,491	$1,732,202	0.488	$845,318
2032	$101,566,693	$86,958,745	$14,607,948	0.473	$6,914,359
2033	$101,566,693	$86,958,745	$14,607,948	0.459	$6,706,459
2034	$101,566,693	$86,958,745	$14,607,948	0.445	$6,504,810
2035	$101,566,693	$86,958,745	$14,607,948	0.432	$6,309,224
Totals	$2,867,306,288	$2,497,139,246	$370,167,042		$240,961,408

PRIMARY ECONOMIC ANALYSIS

Total present value of investment	$43,333,458
Plus: present value of existing assets to be used	$0
Less: present value of existing assets replaced	$0
Less: present value of proposed alternative salvage value	$8,120,523
Total present value of net investment	$35,212,934
Total present value of differential costs	$240,961,408
Plus: present value of status quo investment costs eliminated	$15,033,359
Less: present value of status quo salvage value	$0
Total present value of savings	$255,994,768
Savings/Investment Ratio	7.3
Discounted Payback Period	3.9 Years

For Status Quo:

Recurring Costs:	Transportation Time
	Annual Maintenance
	Periodic Maintenance
	Utilities
	Direct Labor
	Direct Material
	Overhead
Investment Costs:	Equipment Recapitalization
	COE Recommended Repair

For Proposed Alternative:

Recurring Costs:	Utilities
	Annual Maintenance
	Periodic Maintenance
	Direct Labor
	Direct Material
	Overhead
Investment Costs:	Initial Construction
	Initial Operating Equipment
	Communica- tions

1. COMPONENT	FY 2008 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
AIR FORCE	(computer generated)	

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
TINKER AIR FORCE BASE, OKLAHOMA	CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
72896	211-254	WWYK043008	35,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST
CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FAC				22,462
OVERHAUL SHOPS	SM	3,037	1,576	(4,786)
FUEL CONTROL CLEAN AREA	SM	1,121	2,178	(2,442)
TEST SUPPORT AREA	SM	836	2,008	(1,679)
FLAMMABLE FUELS TEST AREA	SM	4,833	1,826	(8,825)
ADMINISTRATIVE SUPORT	SM	3,160	1,427	(4,509)
ANTITERRORISM FORCE PROTECTION	SM	12,987	17	(221)
SUPPORTING FACILITIES				8,938
UTILITIES	LS			(1,073)
PAVEMENT	LS			(429)
SITE IMPROVEMENTS	LS			(2,178)
ELECTRICAL SERVICE	LS			(2,575)
AIR CONDITIONING PLANT	LS			(751)
STORM DRAINAGE	LS			(215)
FUEL STORAGE TANKS	LS			(536)
DRILLED PIERS	LS			(644)
COMMUNUCATIONS	LS			(536)
SUBTOTAL				31,399
CONTINGENCY (5.0 %)				1,570
TOTAL CONTRACT COST				32,969
SUPERVISION, INSPECTION AND OVERHEAD (5.7 %)				1,879
TOTAL REQUEST				34,849
TOTAL REQUEST (ROUNDED)				35,000
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(9,000)

10. Description of Proposed Construction: Drilled piers with concrete slab, masonry walls, structural steel frame, exterior brick veneer finish and sloped metal roof. The facility will provide space for shops, controlled areas, and administrative support. Include pavements and site improvements, utilities, exterior lighting, and fire protection. . Comply with United Facilities Criteria 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, 8 Oct 2003.

11. REQUIREMENT: 62,938 SM ADEQUATE: 49,951 SM SUBSTANDARD: 12,987 SM

PROJECT: Construct a Consolidated Fuel Overhaul, Repair and Test Facility. (Current Mission) . Comply with United Facilities Criteria 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, 8 Oct 2003.

REQUIREMENT: A consolidated facility is required to provide a reliable and responsive organic source of repair for first line weapons systems to integrate, repair, overhaul and test aircraft fuel control accessories in support of the A-10, B-1B,B2-B,B-52H,C-

1. COMPONENT AIR FORCE	FY 2008 MILITARY CONSTRUCTION PROJECT DATA (computer generated)		2. DATE
3. INSTALLATION AND LOCATION TINKER AIR FORCE BASE, OKLAHOMA		4. PROJECT TITLE CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY	
5. PROGRAM ELEMENT 72896	6. CATEGORY CODE 211-254	7. PROJECT NUMBER WWYK043008	8. PROJECT COST ($000) 35,000

130,C-135,C-141,CH-53,E-3,F-14,F-15,F-16 and T-37 aircraft. The facility requires conventional space as well as controlled areas including a Class 300,000 clean room and Class 1 Div 1 flammable fuels hazardous test areas with special electrical considerations. A facility with modern equipment and renovated space is essential to provide the proper controlled atmospheres for fuel control overhaul and repair. Comply with DoD force protection requirements per unified facilities criteria.

CURRENT SITUATION: The fuel controls repair, overhaul, and testing are conducted in two separate facilities constructed in 1943. These facilities are the only source of repair and test for many DoD aircraft fuel controls. Items are repaired and overhauled in a 300,000 class environmental controlled area in building 3001. This controlled area is in need of a $1.5M major renovation to bring it up to current standards. After the components are repaired and overhauled, they are transported approximately one quarter of a mile to building 3108 for final testing and acceptance. Building 3108 is constructed with asbestos siding, contains electrical systems that are outdated and need modernization, and lacks hazardous material spill containment as required by the Uniform Building Code and the National Fire Code. Significant time loss occurs throughout the process as a result of parts being transported back and forth between buildings. This time loss causes delays in meeting necessary production schedules and keeps aircraft out of service for a longer period of time. The consolidation and construction of a new facility will increase the efficiency of the process by 20% with a payback period of 1.51 years.

IMPACT IF NOT PROVIDED: Fuels personnel will be continue to be housed in substandard, outdated and inefficient facilities. Existing work areas will be inadequate to accommodate the modern equipment required to efficiently process the fuels controls. Geographically separated facilities will continue to impact process timelines and delay the return of aircraft to operational status. Cost savings due to the improved efficiencies of the consolidated facility will not be realized. In the event of a catastrophic failure in the existing facilities many aircraft will be grounded.

ADDITIONAL: There is no criteria/scope for this project specified in Air Force Handbook 32-1084, "Facility Requirements." An economic analysis has been prepared comparing the alternatives of new construction, renovation, out-contracting and status quo operation. Based on the net present values and benefits of the respective alternatives, new construction was found to be the most cost efficient over the life of the project with a savings to investment ratio (SIR) of 7.3 and a payback of 3.9 years. Base Civil Engineer: Mr. Stephen P. Mallot (405) 734-3451. Fuel Overhaul, Repair, and Test Fac: 12,987 SM ; Overhaul Shops 3,037 SM ; Fuel Control Clean 1,121 SM ; Test Support 836 SM; Flammable Fuels Test Area 4,833; Administrative 3,160 SM .

JOINT USE CERTIFICATION: This facility can be used by other components on an "as available" basis; however, the scope of the project is based on Air Force requirements.

1. COMPONENT	FY 2008 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
AIR FORCE	(computer generated)	

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
TINKER AIR FORCE BASE, OKLAHOMA	CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
72896	211-254	WWYK043008	35,000

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Project to be accomplished by design-build procedures

(2) Basis:
(a) Standard or Definitive Design - NO
(b) Where Design Was Most Recently Used -

(3) All Other Design Costs

(4) Construction Contract Award

(5) Construction Start

(6) Construction Completion

(7) Energy Study/Life-Cycle analysis was/will be performed NO

b. Equipment associated with this project provided from other appropriations:

EQUIPMENT NOMENCLATURE	PROCURING APPRO	FISCAL YEAR APPROPRIATED OR REQUESTED	COST ($000)
INITIAL OUTFITTING EQUIPMENT	3010	2008	7,536
COMMUNICATIONS FROM STEM-B	3010	2008	1,464

Tomlinson Deborah L Civ OC-ALC/FMC

From: Dell Harry J Contr 72 ABW/CEC

Sent: Monday, January 24, 2005 6:23 AM

To: Gaughran Gary L CIV OC-ALC/FMC

Cc: Grimes Jim D Civ OC-ALC/FMC; Tomlinson Deborah L Civ OC-ALC/FMC; Fox Larry Civ AETC CONS/LGCK; McKee John M Civ OC-ALC/FMA; King Thelma J Civ OC-ALC/FMC; Powell Paul A Civ 72 ABW/CECED; Powell Paul A Civ 72 ABW/CECED; Lee Stephen W Contr 72 ABW/CEC

Subject: Renovation costs versus new construction for Economic Analysis

Signed By: harry.dell@tinker.af.mil

Importance: High

Gary -

It is estimated that the renovation alternative will cost 1.3 times the new construction alternative because you must first "tear down" and then rebuild.

V/R

Harry
72 ABW/CECR
DSN 884-5238
Phone:405-734-5238
FAX:405-734-5538

CONSOLIDATED FUELS TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: STATUS QUO

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT			1.85
NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
TOTAL ANNUAL MAINTENANCE COST	YEAR $s	FY05	$ 243,108.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $		$ 258,626.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 1942

DATA SOURCE:
Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT				$ 10.75
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,412,657.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,532,166.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2008	
LIFE EXPECTANCY: 20				
YEARS M&R WOULD BE REQUIRED:				
2028 NA NA NA NA NA NA NA NA				

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT				$13.50
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,924,116.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2008	
LIFE EXPECTANCY: 10				
YEARS M&R WOULD BE REQUIRED:				
2018 2028 NA NA NA NA NA NA NA				

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT				$6.75
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$887,017.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$962,058.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2008	
LIFE EXPECTANCY: 10				
YEARS M&R WOULD BE REQUIRED:				
2018 2028 NA NA NA NA NA NA NA				

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

CEILING FINISHES

M&R COST PER SQUARE FOOT			$3.51
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$461,249.10
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$500,270.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2018	2028	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 1999
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2019	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT			$9.40
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,235,254.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,339,755.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,482,365.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,776,969.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2001
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2021	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$755,607.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$819,531.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2038	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,622,913.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,760,210.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2028	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE YARD			$6.76
NUMBER OF SQUARE YARDS SPACE			27,222
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$184,020.72
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$199,589.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008

LIFE EXPECTANCY: 15

YEARS M&R WOULD BE REQUIRED:

2023	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004

POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: STATUS QUO

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		PROGRAM YEAR		2008							
ANALYSIS PERIOD (YEARS)	28										
ECONOMIC LIFE OF FACILITY - 55 YEARS	STOCK NUMBER	EST	OSD RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR LAST	YR REP	YR REP	YR REP
ITEM	PART NUMBER	COST	INFL INDEX	PROG YR $		PROG YR $	(YEARS)	REPLACED	REQ	REQ	REQ
ROOFING	NA	$1,412,658	0.922	$1,532,166	1	$1,532,166	20	2008	2028	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	10	2008	2018	2028	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$887,018	0.922	$962,058	1	$962,058	10	2008	2018	2028	NA
CEILING FINISHES	NA	$461,249	0.922	$425,272	1	$425,272	10	2008	2018	2028	NA
HVAC	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	20	1999	2019	NA	NA
PLUMBING	NA	$1,235,254	0.922	$1,339,755	1	$1,339,755	30	2008	2038	NA	NA
ELECTRICAL	NA	$3,776,969	0.922	$3,776,969	1	$3,776,969	20	2001	2021	NA	NA
FIRE PROTECTION AND DETECTION	NA	$755,608	0.922	$819,531	1	$819,531	30	2008	2038	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,622,914	0.922	$1,760,210	1	$1,760,210	20	2008	2028	NA	NA
CONCRETE/ASPHALT PAVING	NA	$184,021	0.922	$199,589	1	$199,589	15	2008	2023	NA	NA

		EST	USAF RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR	YR REP	YR REP	YR REP
		COST	INFL FACTOR	PROG YR $		PROG YR $	(YEARS)	PURCHASED	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:											
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ROOFING	$1,532,166	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$962,058	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058
CEILING FINISHES	$425,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425,272
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$819,531	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$1,760,210	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$199,589	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$7,622,942	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,311,446
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: STATUS QUO

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS						
ANALYSIS PERIOD (YEARS)						
ECONOMIC LIFE OF FACILITY - 55 YEARS	YR REP	YR REP	YR REP	YR REP	YR REP	YR REP
ITEM	REQ	REQ	REQ	REQ	REQ	REQ
ROOFING	NA	NA	NA	NA	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA	NA
CEILING FINISHES	NA	NA	NA	NA	NA	NA
HVAC	NA	NA	NA	NA	NA	NA
PLUMBING	NA	NA	NA	NA	NA	NA
ELECTRICAL	NA	NA	NA	NA	NA	NA
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	NA	NA	NA	NA	NA
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA	NA
	YR REP	YR REP	YR REP	YR REP	YR REP	YR REP
	REQ	REQ	REQ	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:						
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,532,166	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425,272	$0	$0	$0	$0	$0	$0	$0
HVAC	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$3,776,969	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,760,210	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$199,589	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$1,924,116	$0	$3,776,969	$0	$199,589	$0	$0	$0	$0	$6,603,822	$0	$0	$0	$0	$0	$0	$0
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: STATUS QUO

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)			2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
ANNUAL ELECTRICITY CONSUMPTION (Kwh)			331,127
COST PER Kwh OF ELECTRICITY			$ 0.05110
TOTAL ANNUAL ELECTRICITY COST	YEAR $s	FY05	$ 16,920.61
DRI USER PRICE INDICES	BASE YEAR	FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $		$ 17,276.00

WATER

NUMBER OF SQUARE FEET			131,410.00
CONSUMPTION PER SQUARE FOOT (KGAL)			0.0002
TOTAL ANNUAL WATER USE (KGAL)			26.28
COST PER KGAL OF WATER			$ 2.1280
TOTAL ANNUAL WATER COST	YEAR $s	FY05	$ 55.93
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $		$ 59.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET			131,410
CONSUMPTION PER SQUARE FOOT (KGAL)			0.0018
TOTAL ANNUAL WATER USE (KGAL)			236.54
COST PER KGAL OF WATER			$ 2.1280
TOTAL ANNUAL WATER COST	YEAR $s	FY05	$ 503.35
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $		$ 535.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
COST PER SQUARE FOOT			0.1891
TOTAL ANNUAL STEAM COST	YEAR $s	FY05	$ 24,848.44
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
ANNUAL STEAM COST	FY08 CONSTANT $		$ 26,435.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: STATUS QUO

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$ 17,276.00
WATER		$ 59.00
SEWAGE TREATMENT		$ 535.00
STEAM		$ 26,435.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$ 44,305.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.
POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: RENOVATION

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT				0.58
NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
TOTAL ANNUAL MAINTENANCE COST	YEAR $s		FY05	$ 76,217.80
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $			$ 81,083.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 2011

	FROM:	TO:		
BUILDING AGE MULTIPLIER DURING YEARS:	2011	2021	1.00	$ 81,083.00
BUILDING AGE MULTIPLIER DURING YEARS:	2021	2031	1.40	$ 113,516.00
BUILDING AGE MULTIPLIER DURING YEARS:	2031	2041	1.90	$ 154,058.00
BUILDING AGE MULTIPLIER DURING YEARS:	2041	2051	2.10	$ 170,274.00
BUILDING AGE MULTIPLIER DURING YEARS:	2051	2061	2.10	$ 170,274.00
BUILDING AGE MULTIPLIER DURING YEARS:	2061	50+	1.65	$ 133,787.00

DATA SOURCE:

Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT			$ 10.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,412,657.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,532,166.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT			$6.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$887,017.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$962,058.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

CEILING FINISHES

M&R COST PER SQUARE FOOT			$3.51
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$461,249.10
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$500,270.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT			$9.40
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,235,254.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,339,755.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,482,365.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,776,969.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$755,607.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$819,531.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2041	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,622,913.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,760,210.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE FOOT			$24.00
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,153,840.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,420,651.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011

LIFE EXPECTANCY: 15

YEARS M&R WOULD BE REQUIRED:

2026	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL REPAIR, TEST AND OVERHAUL FACILITY
WORKSHE A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: RENOVATION

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		PROGRAM YEAR		2008								
ANALYSIS PERIOD (YEARS)	28											
ECONOMIC LIFE OF FACILITY - 55 YEARS	STOCK NUMBER	EST	OSD RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR LAST	YR REP	YR REP	YR REP	YR REP
ITEM	PART NUMBER	COST	INFL INDEX	PROG YR $		PROG YR $	(YEARS)	REPLACED	REQ	REQ	REQ	REQ
ROOFING	NA	$1,412,658	0.922	$1,532,166	1	$1,532,166	20	2011	2031	NA	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	10	2011	2021	2031	NA	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$887,018	0.922	$962,058	1	$962,058	10	2011	2021	2031	NA	NA
CEILING FINISHES	NA	$461,249	0.922	$425,272	1	$425,272	10	2011	2021	2031	NA	NA
HVAC	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	20	2011	2031	NA	NA	NA
PLUMBING	NA	$1,235,254	0.922	$1,339,755	1	$1,339,755	30	2011	2041	NA	NA	NA
ELECTRICAL	NA	$3,776,969	0.922	$3,776,969	1	$3,776,969	20	2011	2031	NA	NA	NA
FIRE PROTECTION AND DETECTION	NA	$755,608	0.922	$819,531	1	$819,531	30	2011	2041	NA	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,622,914	0.922	$1,760,210	1	$1,760,210	20	2011	2031	NA	NA	NA
CONCRETE/ASPHALT PAVING	NA	$3,153,840	0.922	$3,420,651	1	$3,420,651	15	2011	2026	NA	NA	NA

		EST	USAF RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR	YR REP	YR REP	YR REP	YR REP
		COST	INFL FACTOR	PROG YR $		PROG YR $	(YEARS)	PURCHASED	REQ	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:												
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

CONSOLIDATED FUEL REPAIR, T⁼ST AND OVERHAUL FACILITY

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TOTAL PERIODIC MAINTENANCE, REPAI AND REPLACMENT COSTS BY YEAR

ALTERNATIVE: RENOVATION

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS																
ANALYSIS PERIOD (YEARS)																
ECONOMIC LIFE OF FACILITY - 55 YEARS	YR REP	YR REP	YR REP	YR REP	YR REP											
ITEM	REQ	REQ	REQ	REQ	REQ											
ROOFING	NA	NA	NA	NA	NA											
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA											
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA											
CEILING FINISHES	NA	NA	NA	NA	NA											
HVAC	NA	NA	NA	NA	NA											
PLUMBING	NA	NA	NA	NA	NA											
ELECTRICAL	NA	NA	NA	NA	NA											
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA											
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	NA	NA	NA	NA											
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA											
	YR REP	YR REP	YR REP	YR REP	YR REP											
	REQ	REQ	REQ	REQ	REQ											
INPUT ADDITIONAL ITEMS HERE:																
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,532,166	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$962,058	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058	$0	$0	$0	$0
CEILING FINISHES	$0	$425,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425,272	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,776,969	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,760,210	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$3,420,651	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$3,311,446	$0	$0	$0	$0	$3,420,651	$0	$0	$0	$0	$12,304,807	$0	$0	$0	$0
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: RENOVATION

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)				2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
ANNUAL ELECTRICITY CONSUMPTION (Kwh)				331,127
COST PER Kwh OF ELECTRICITY				$ 0.05110
TOTAL ANNUAL ELECTRICITY COST		YEAR $s	FY05	$ 16,920.61
DRI USER PRICE INDICES	BASE YEAR		FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 17,276.00
ESTIMATED ENERGY SAVINGS 25%				$ 4,319.00
TOTAL ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 12,957.00

WATER

NUMBER OF SQUARE FEET				131,410.00
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0002
TOTAL ANNUAL WATER USE (KGAL)				26.28
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 55.93
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 59.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET				131,410
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0018
TOTAL ANNUAL WATER USE (KGAL)				236.54
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 503.35
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 535.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
COST PER SQUARE FOOT				0.1891
TOTAL ANNUAL STEAM COST		YEAR $s	FY05	$ 24,848.44
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
ANNUAL STEAM COST	FY08 CONSTANT $			$ 26,435.00
ESTIMATED ENERGY SAVINGS 25%				$ 6,609.00
TOTAL ANNUAL STEAM COST	FY08 CONSTANT $			$ 19,826.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: RENOVATION

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$ 12,957.00
WATER		$ 59.00
SEWAGE TREATMENT		$ 535.00
STEAM		$ 26,435.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$ 39,986.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.

POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: NEW CONSTRUCTION

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT			0.58
NUMBER OF SQUARE FEET OF BUILDING SPACE			140,000
TOTAL ANNUAL MAINTENANCE COST	YEAR $s	FY05	$ 81,200.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $		$ 86,383.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 2011

	FROM:	TO:		
BUILDING AGE MULTIPLIER DURING YEARS:	2011	2021	1.00	$ 86,383.00
BUILDING AGE MULTIPLIER DURING YEARS:	2021	2031	1.40	$ 120,936.00
BUILDING AGE MULTIPLIER DURING YEARS:	2031	2041	1.90	$ 164,128.00
BUILDING AGE MULTIPLIER DURING YEARS:	2041	2051	2.10	$ 181,404.00
BUILDING AGE MULTIPLIER DURING YEARS:	2051	2061	2.10	$ 181,404.00
BUILDING AGE MULTIPLIER DURING YEARS:	2061	50+	1.65	$ 142,532.00

DATA SOURCE:

Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT			$ 10.75
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,505,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,632,321.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:
2031 NA NA NA NA NA NA NA NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,890,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$2,049,892.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:
2021 2031 NA NA NA NA NA NA NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT			$6.75
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$945,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,024,946.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:
2021 2031 NA NA NA NA NA NA NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

CEILING FINISHES

M&R COST PER SQUARE FOOT			$3.51
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$491,400.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$532,972.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,890,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$2,049,892.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT			$9.40
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,316,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,427,332.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,710,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,023,861.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$805,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$873,102.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2041	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,729,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,875,271.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY:
YEARS M&R WOULD BE REQUIRED:

2011	2011	2011	2011	2011	2011	2011	2011	2011

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE FOOT			$24.00
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,360,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,644,252.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011

LIFE EXPECTANCY: 15

YEARS M&R WOULD BE REQUIRED:

2026	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004

POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WORKSHEET 2A
TOTAL [illegible]ODIC
CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: NEW CONSTRUCTIVE

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		PROGRAM YEAR		2008								
ANALYSIS PERIOD (YEARS)	28											
ECONOMIC LIFE OF FACILITY - 55 YEARS	STOCK NUMBER	EST	OSD RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR LAST	YR REP	YR REP	YR REP	YR REP
ITEM	PART NUMBER	COST	INFL INDEX	PROG YR $		PROG YR $	(YEARS)	REPLACED	REQ	REQ	REQ	REQ
ROOFING	NA	$1,505,000	0.922	$1,632,321	1	$1,632,321	20	2011	2031	NA	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,890,000	0.922	$2,049,892	1	$2,049,892	10	2011	2021	2031	NA	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$945,000	0.922	$1,024,946	1	$1,024,946	10	2011	2021	2031	NA	NA
CEILING FINISHES	NA	$491,400	0.922	$453,071	1	$453,071	10	2011	2021	2031	NA	NA
HVAC	NA	$1,890,000	0.922	$2,049,892	1	$2,049,892	20	2011	2031	NA	NA	NA
PLUMBING	NA	$1,316,000	0.922	$1,427,332	1	$1,427,332	30	2011	2041	NA	NA	NA
ELECTRICAL	NA	$4,023,861	0.922	$4,023,861	1	$4,023,861	20	2011	2031	NA	NA	NA
FIRE PROTECTION AND DETECTION	NA	$805,000	0.922	$873,102	1	$873,102	30	2011	2041	NA	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,729,000	0.922	$1,875,271	1	$1,875,271	0	2011	2011	2011	2011	2011
CONCRETE/ASPHALT PAVING	NA	$3,360,000	0.922	$3,644,252	1	$3,644,252	15	2011	2026	NA	NA	NA
		EST	USAF RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR	YR REP	YR REP	YR REP	YR REP
		COST	INFL FACTOR	PROG YR $		PROG YR $	(YEARS)	PURCHASED	REQ	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:												
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$1,875,271	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$0	$0	$1,875,271	$0	$0	$0	$0	$0	$0	$0	$0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

WORKSHFET 2A

TOTAL [illegible] DIC

CONSOLIDATED FUEL TEST, RE[illegible]IR AND OVERHAUL FACILITY

MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR

ALTERNATIVE: NEW CONSTRUCTIVE

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS																
ANALYSIS PERIOD (YEARS)																
ECONOMIC LIFE OF FACILITY - 55 YEARS	YR REP	YR REP	YR REP	YR REP	YR REP											
ITEM	REQ	REQ	REQ	REQ	REQ											
ROOFING	NA	NA	NA	NA	NA											
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA											
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA											
CEILING FINISHES	NA	NA	NA	NA	NA											
HVAC	NA	NA	NA	NA	NA											
PLUMBING	NA	NA	NA	NA	NA											
ELECTRICAL	NA	NA	NA	NA	NA											
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA											
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	2011	2011	2011	2011	2011											
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA											
	YR REP	YR REP	YR REP	YR REP	YR REP											
	REQ	REQ	REQ	REQ	REQ											
INPUT ADDITIONAL ITEMS HERE:																
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,632,321	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$2,049,892	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,049,892	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$1,024,946	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,024,946	$0	$0	$0	$0
CEILING FINISHES	$0	$453,071	$0	$0	$0	$0	$0	$0	$0	$0	$0	$453,071	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,049,892	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,023,861	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$3,644,252	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$3,527,909	$0	$0	$0	$0	$3,644,252	$0	$0	$0	$0	$11,233,983	$0	$0	$0	$0
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: NEW CONSTRUCTION

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)				2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE				140,000
ANNUAL ELECTRICITY CONSUMPTION (Kwh)				352,773
COST PER Kwh OF ELECTRICITY				$ 0.05110
TOTAL ANNUAL ELECTRICITY COST		YEAR $s	FY05	$ 18,026.68
DRI USER PRICE INDICES	BASE YEAR		FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 18,405.00
ESTIMATED ENERGY SAVINGS 35%				$ 6,442.00
TOTAL ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 11,963.00

WATER

NUMBER OF SQUARE FEET				140,000.00
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0002
TOTAL ANNUAL WATER USE (KGAL)				28.00
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 59.58
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 63.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET				140,000
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0018
TOTAL ANNUAL WATER USE (KGAL)				252.00
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 536.26
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 570.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE				140,000
COST PER SQUARE FOOT				0.1891
TOTAL ANNUAL STEAM COST		YEAR $s	FY05	$ 26,472.73
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.938
ANNUAL STEAM COST	FY08 CONSTANT $			$ 28,223.00
ESTIMATED ENERGY SAVINGS 35%				$ 9,878.00
TOTAL ANNUAL STEAM COST	FY08 CONSTANT $			$ 18,345.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: NEW CONSTRUCTION

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$	11,963.00
WATER		$	63.00
SEWAGE TREATMENT		$	570.00
STEAM		$	28,223.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$	40,819.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.
POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

			Inflation Index	FY08 Constant $
ROOF/REPLACEMNT- AIR HDLNG UNITS & COOLING TWRS/CHILLERS-3108-A2	FQ203073100100	$ 2,431,069.00		
REPLACE COOLING TOWER/CHILLER - B3108	FQ203080420100	$ 1,257,500.00		
PAINT EXTERIOR - B3108	F555DE91553000	$ 44,976.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108 & AMEND1	F7TIPR8026-0100	$ 32,000.00		
FY99 TOTAL	**FY99 TOTAL**	**$ 3,765,545.00**	**0.860**	**$ 4,377,715**
REPLACE ELEC SYS,FIRE ALARM, EMER&EXIT LGHTS - PHASE 1 -N. ANNX-3108	FD2030-00-57360	$ 3,200,000.00		
INSTALL/REPLACE SPKLERS,STRUCTURAL FIXES,PAINT, PHASE 2 -N. ANNX-3108	FD2030-00-57361	$ 1,200,000.00		
REPLACE BUSWAYS/SWITCHES & REPAIR SAFETY SYSTEMS - B3108 - AMEND 1	FD2030-00-57336	$ 200,000.00		
EMERGENCY REPAIR AIR HANDLERS, SOUTH END - B3108 .	F555DE01091000	$ 165,000.00		
REPLACE BUSWAYS/SWITCHES & REPAIR SAFETY SYSTEMS - B3108	FD2030-00-57336	$ 110,000.00		
REPAIR ROOF & REPLACE AIR HANDLING UNITS PHASE 2 - B3108		$ 108,057.00		
A & E SERVICES FOR ROOF STRUCTURE ANALYSIS - B3108	F555DE93641000	$ 37,315.00		
STUDY TO REPLACE BUSWAY/SWITCHES - B3108	FQ203092521000	$ 35,000.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR9137-0100	$ 25,000.00		
REPLACE BUSWAY/SWITCHES(CIRCUIT BREAKERS) - B3108	F555DE92522000	$ 22,000.00		
REMOVE EXISTING AND INSTALL NEW CARPET TILES-2ND FLOOR ADMIN-B3108	HY070059	$ 3,000.00		
REPLACE BUSWAY/SWITCHES(CIRCUIT BREAKERS) S. ANNX - B3108 - AMEND 1	F555DE92522000	$ 815.00		
FY00 TOTAL	**FY00 TOTAL**	**$ 5,106,187.00**	**0.872**	**$ 5,854,346**
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR0187-0100	$ 28,500.00		
FY01 TOTAL	**FY01 TOTAL**	**$ 28,500.00**	**0.888**	**$ 32,098**
STRUCTUAL REPAIR		$ 256,000.00		
CLEAN FLOOR TRENCHES AND FLOOR		$ 140,000.00		
LIGHTNING AND GROUNDING PROTECTION UPGRADE		$ 230,000.00		
REPLACE EXTERIOR DOORS		$ 250,000.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR1130-0300	$ 31,350.00		
REPLACEMENT OF DOCK LEVELER (EQUIP ELEVATOR)-B3108		$ 25,000.00		
REPLACE HVAC UNIT, SOUTH SECTION - B3108		$ 900,000.00		
REPLACE LIGHT FIXTURES, SOUTH SECTION - B3108		$ 150,000.00		
PAINT INTERIOR - B3108		$ 70,000.00		
FY02 TOTAL	**FY02 TOTAL**	**$ 2,052,350.00**	**0.895**	**$ 2,293,110**
RENOVATE 2ND FLOOR ADMIN -B3108		$ 380,120.00		
INTERIOR RENOVATION-B3108		$ 300,000.00		
ALLEYWAY PAVEMENT REPAIR-BETWEEN B3001/B3108		$ 300,000.00		
MAINT C02 FIRE PROTECTION SYS PHASE 2 - B3902 & B3108		$ 70,000.00		
FY03 TOTAL	**FY03 TOTAL**	**$ 1,050,120.00**	**0.904**	**$ 1,161,692**
Interior Renovation		$ 170,000.00		
Expand Production Admin Area		$ 20,000.00		
Replace PMEL Floor		$ 29,000.00		
FY04 TOTAL	**FY04 TOTAL**	**$ 219,000.00**	**0.922**	**$ 237,518**

Exterior Doors Replacement		$ 180,000.00		
Repair/Replace Roof		$ 300,000.00		
Repair Air Handling Unit		$ 200,000.00		
Install Protection Rail for Fire Escape		$ 5,000.00		
Install Exhaust Fan (Electrical Room)		$ 3,000.00		
Interior Painting		$ 300,000.00		
FY05 TOTAL	FY05 TOTAL	$ 988,000.00	0.940	$ 1,050,530
Motor Control Center		$ 70,000.00		
Replace Lightning Protection		$ 175,000.00		
Replace Fuel Leak Detection		$ 300,000.00		
	FY06 TOTAL	$ 545,000.00	0.959	$ 568,130
				$ 15,575,139

TRANSPORTATION COST CALCULATIONS

Building 3902									
No. People	Series/Grade	Estimated Time	Total Estimated Time (Hours per Week)	Total Estimated Time (Hours per Year)	Hourly Rate Step 4	Acceleration Factor	Accelerated Hourly Rate	Inflation Index	Estimated Annual Cost FY05$
1	WG6904-6	3x/day (30 Min)	7.5	390	18.09	1.545	27.95	0.93094	10148
1	WG2616-6	3x/day (30 Min)	7.5	390	18.09	1.545	27.95	0.93094	10148
1	WG8255-9	10x/week (15 min)	2.5	130	21.24	1.545	32.82	0.93094	3972
1	WG8255-10	3x/week (15 min)	0.75	39	22.25	1.545	34.38	0.93094	1248
1	WG8255-11	3x/week (15 min)	0.75	39	23.23	1.545	35.89	0.93094	1303
Swing Shift									
1	WS8255-10	2x/night (15 min)	2.5	130	23.92	1.545	36.96	0.93094	4473
Building 3108 - Shop Rotates Mechanics									
No. People	Series/Grade	Estimated Time	Total Estimated Time (Hours per Week)	Total Estimated Time (Hours per Year)	Hourly Rate	Acceleration Factor	Accelerated Hourly Rate	Inflation Index	Estimated Annual Cost FY05$
1	WG8255-9	3x/day (15 Min)	3.75	195	21.24	1.545	32.82	0.93094	5958
1	WG3359-9	2x/week (15 Min)	0.5	26	21.24	1.545	32.82	0.93094	794
1	WG2854-9	2x/week (15 Min)	0.5	26	21.24	1.545	32.82	0.93094	794
3	WG2854-9	3x/week (15 Min)	2.25	117	21.24	1.545	32.82	0.93094	3575
Estimated Annual Transportation Cost									$ 42,413

Lean Transformation Savings

Data in FY04 $	Direct Labor	Inflation	FY08 $s
Status Quo Cost	$ 14,252,635	0.898	15,871,531
New Construction 16.5% Reduction	$ 11,900,950	0.898	13,252,728
	Direct Materials	Inflation	FY08 $s
Status Quo Cost	$ 53,568,792	0.922	58,100,642
New Construction 15% Reduction	$ 45,533,473	0.922	49,385,546
	Overhead	Inflation	FY08 $s
Status Quo Cost	$ 25,123,740	0.922	27,249,176
New Construction 11.5% Reduction	$ 22,234,510	0.922	24,115,521

			Hazardous Fuel Component Study				
				B3108 March 1991			
Items not repaired in B3108 as recommended by the U.S. Army Corps of Engineers							
Over and Above Periodic Maintenance							
Site Conditions:							
	Paving						$70,000.00
	Steam Utilities						$114,000.00
	Remove Asbestos (Outside)						$98,322.00
	Install 12" CMU w/4" face brick						$498,858.00
	Brick Ledge						$12,401.00
	Doors and Hardware						$30,000.00
	Industrial O/H Doors						$35,200.00
	Sub-Total						**$858,781.00**
Architectural:							
	New Roof A,B, and C		(Est for Areas D,E, and F)				$238,000.00
	Handicap Access Issues						
		Second Floor Removal					$36,348.00
		Construct Support Area					$220,000.00
		Landings and Ramps					$168,530.00
		Stairs					$23,520.00
	Sub-Total	**Sub-Total**					**$686,398.00**
Mechanical Systems:							
	HVAC						
	Chiller						
	Hot Water System to Replace Steam						
	New Compressed Air and Piping Systems						
	New Plumbing						
	Sub-Total						**$2,178,600.00**
	TOTAL						**$3,723,779.00**
	Indirect Costs			40%			$5,213,290.60
	Contingencies			10%			$5,734,619.66
	Grand Total in 1991 Dollars						**$5,734,619.66**
	Raw Inflation Factor						0.742
	Grand Total in 2008 Dollars						**$7,728,598**

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

MEMORANDUM FOR SEE DISTRIBUTION

18 MAY 2005

FROM: HQ AFMC/FM
4375 Chidlaw Rd, Rm N201
Wright Pattereson AFB OH 45433-5006

SUBJECT: HQ AFMC Military Construction and Capital Purchase Program Economic Analysis (EA) Certification

1. The Center and Air Base Wing Re-Organization process has now matured sufficiently to clarify appropriate certification requirements for both Military Construction and Capital Purchase Program EAs. AFMAN 65-506, Economic Analysis, 5 Sep 03, directs Base Level Financial Management office certification for all EAs, following coordination by the Center Financial Analysis and functional offices. With the establishment of Air Base Wing Comptroller Squadrons and Center Financial Management Divisions in AFMC, clarification of the certification requirements for EAs is required. Financial Management Certification authority should reside with the office of primary responsibility for funds execution.

2. For Military Construction EAs, the Wing Comptroller has fiduciary responsibility for the execution of those funds. MILCON EAs should be certified by the Air Base Wing Comptroller Squadron. Any Military Construction EA submissions that have not been MAJCOM certified for FY06 and beyond must be coordinated through the appropriate ABW/FM. A sample of a MILCON EA certification page is provided (Atch 1).

3. Depot Maintenance Activity Group purchased equipment and facilities are managed through a revolving fund and the Center Comptroller has fiduciary responsibility for its execution. All Capital Purchase Program EA's will continue to be certified by the Center Financial Management Office. A sample of a CPP EA certification page is provided (Atch 2).

4. All other types of Economic Analysis should be certified by the Financial Management office that will exercise funds execution authority. If you have any questions regarding this policy, please contact Cynthia Uyhelyi, cyndi.uyhelyi@wpafb.af.mil, HQ AFMC/FMPC, DSN 787-5862.

PATRICIA J. ZARODKIEWICZ
Deputy Director, Financial
Management & Comptroller

Attachments
1. Sample - MILCON EA Certification
2. Sample - CPP EA Certification

DISTRIBUTION

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AFSAC/FM
SSG/FM
ASC/FM
311 HSW/FM
377 CPTS/FM
66 CPTS/FM
72 CPTS/FM
75 CPTS/FM
78 CPTS/FM
95 ABW/FM
96 CPTS/FM
88 ABW/FM

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS
CPP - SAMPLE

Installation/MAJCOM: _____

Project Title: _____

An economic analysis has been prepared for this project. The following alternatives have been considered:

a.

b.

c.

Summary of analysis results:

Certification: This economic analysis follows the instructions in AFI 65-501, Economic Analysis, and the procedures in AFMAN 65-506. Significant changes to project scope, major assumptions, or estimated costs will invalidate this certificate and require revision of this analysis.

Coordination at base/installation level:

Base Level Financial Analysis: _____ (Signature)
Joe Smith, OC-ALC/FMC, DSN: 123-4567, 29 Apr 05

Concurrence by Base Functional Office:

_____ (Signature)
Bill Smith, OC-ALC/MANPA, DSN: 123-8910, 29 Apr 05

Concurrence by other Base Level Office:

_____ (Signature)
Bob Smith, 72 MDG/SGBP, DSN: 123-5678, 29 Apr 05

Certification by Base Level FM: _____ (Signature)
Ken Smith, OC-ALC/FM, DSN: 123-6789, 29 Apr 05

Coordination at MAJCOM Level:
MAJCOM Financial Analysis Office:

_____ (Signature)

MAJCOM Functional Office: _____ (Signature)

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS
MILCON EA - SAMPLE

Installation/MAJCOM: _____

Project Title: _____

An economic analysis has been prepared for this project. The following alternatives have been considered:

a.

b.

c.

Summary of analysis results:

Certification: This economic analysis follows the instructions in AFI 65-501, Economic Analysis, and the procedures in AFMAN 65-506. Significant changes to project scope, major assumptions, or estimated costs will invalidate this certificate and require revision of this analysis.

Coordination at base/installation level:

Base Level Financial Analysis: _____ (Signature)
Joe Smith, 72 CPTS/FMA, DSN: 123-4567, 29 Apr 05

Concurrence by Base Functional Office:

_____ (Signature)
Bill Smith, 72 CES/CEM, DSN: 123-8910, 29 Apr 05

Concurrence by other Base Level Office:

_____ (Signature)
Bob Smith, 552 AMXS/CC, DSN: 123-5678, 29 Apr 05

Certification by Base Level FM: _____ (Signature)
Ken Smith, 72 CPTS/FM, DSN: 123-6789, 29 Apr 05

Coordination at MAJCOM Level:
MAJCOM Financial Analysis Office:

_____ (Signature)

MAJCOM Functional Office: _____ (Signature)

COST SENSITIVITY ANALYSIS 1

TITLE: Vary New Const Inv Costs - Alt 1 (SQ) No Change

This sensitivity analysis checks for alternative Status Quo to be ranked least cost as a result of changes in the expense item(s) listed below:

ALTERNATIVE	EXPENSE ITEM(S)
New Construction	Initial Construction
Status Quo	** NOTHING CHANGED **

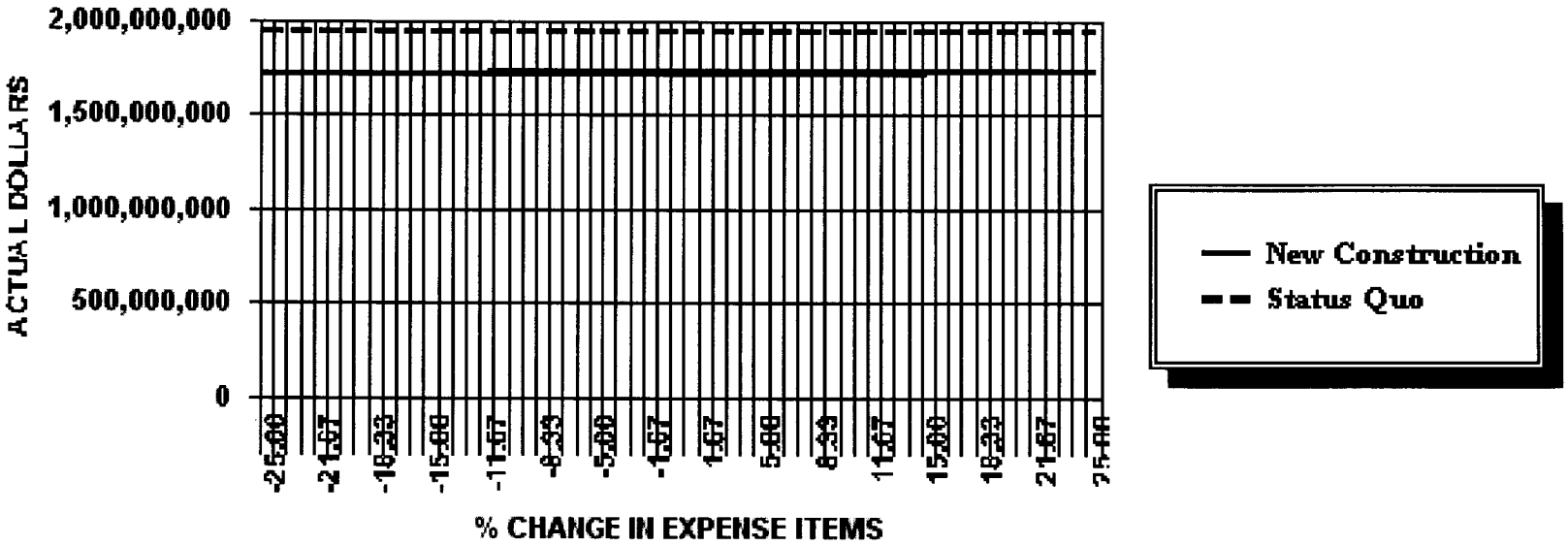
The selected expense items are allowed to vary from a value of -25.00% to 25.00%

ALTERNATIVE	NET PRESENT VALUE
New Construction	$1,723,349,932
Status Quo	$1,944,131,766

RESULTS:

The ranking of alternatives is insensitive to changes in the selected expense item(s), within the allowable range of variation.

COST SENSITIVITY ANALYSIS 1
Vary New Const Inv Costs - Alt 1 (SQ) No Change
Graph of NPV vs. % change in expense items



COST SENSITIVITY ANALYSIS 2

TITLE: Vary SQ Per M&R Costs - Alt 3 No Change

This sensitivity analysis checks for alternative Status Quo to be ranked least cost as a result of changes in the expense item(s) listed below:

ALTERNATIVE	EXPENSE ITEM(S)
Status Quo	Periodic Maintenance
New Construction	** NOTHING CHANGED **

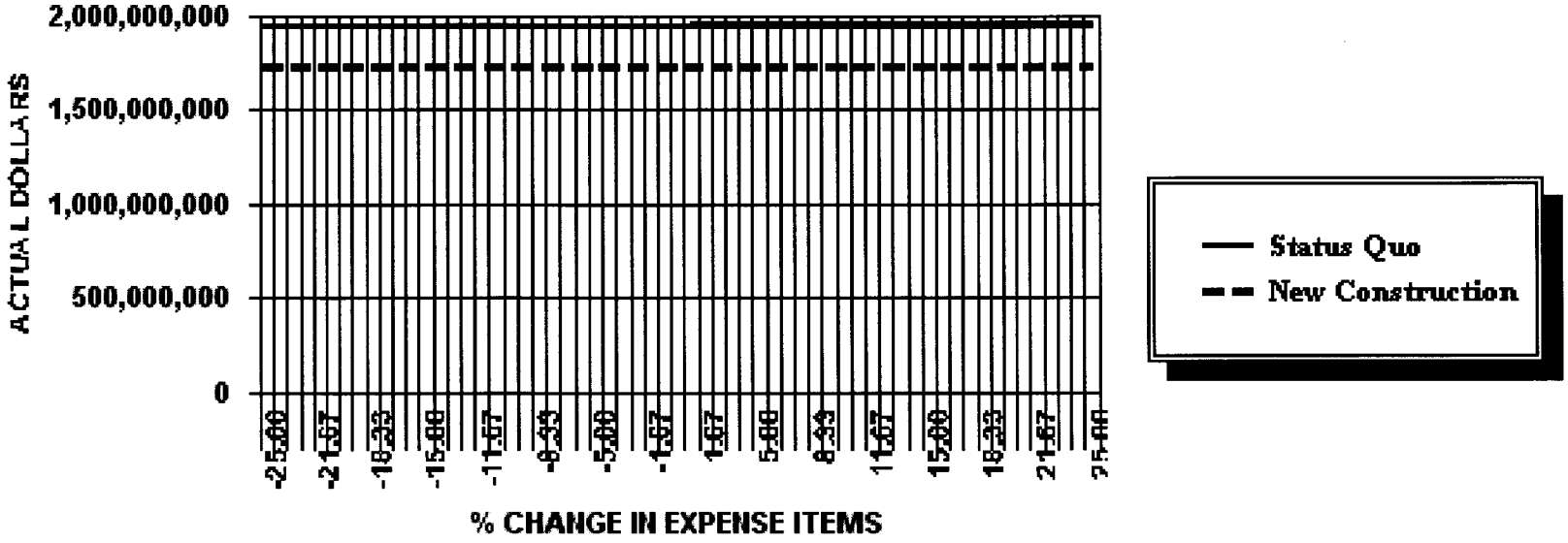
The selected expense items are allowed to vary from a value of -25.00% to 25.00%

ALTERNATIVE	NET PRESENT VALUE
New Construction	$1,723,349,932
Status Quo	$1,944,131,766

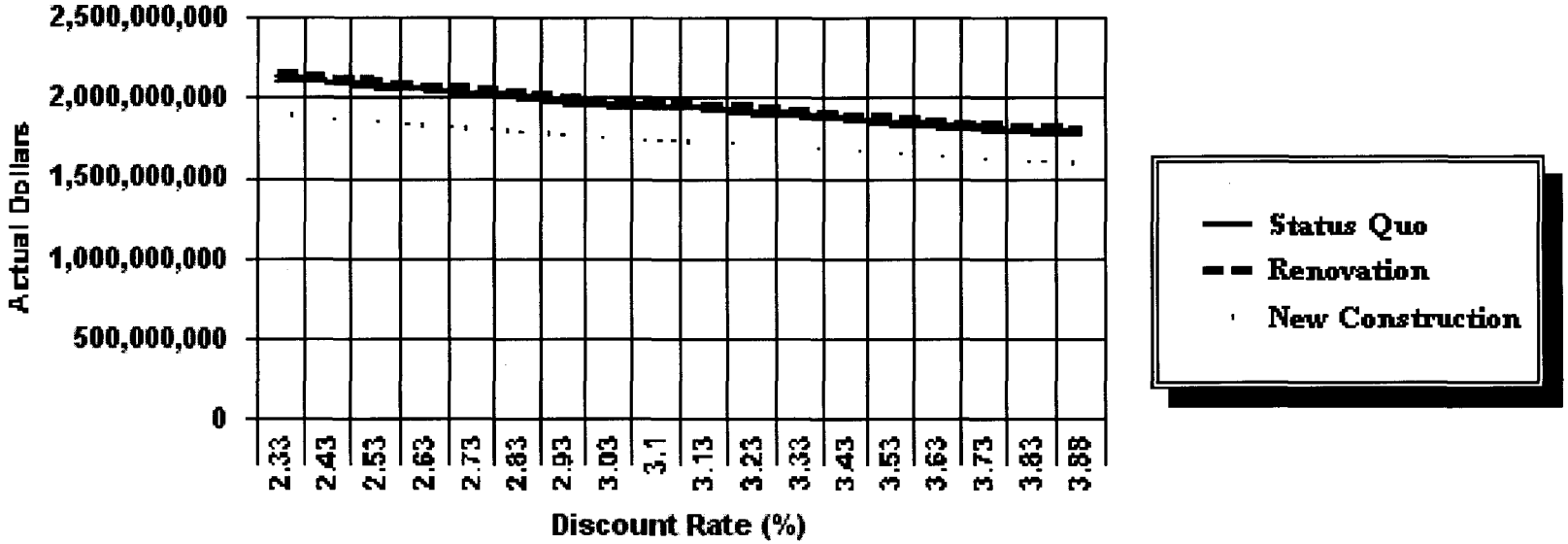
RESULTS:

The ranking of alternatives is insensitive to changes in the selected expense item(s), within the allowable range of variation.

COST SENSITIVITY ANALYSIS 2
Vary SQ Per M&R Costs - Alt 3 No Change
Graph of NPV vs. % change in expense items



DISCOUNT RATE SENSITIVITY ANALYSIS 1
Vary Discount Rate +/- 25%
Graph of Net Present Value vs. Discount Rate



DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Vary Discount Rate +/- 25%

No changes in alternative ranking occurred

Table of Net Present Value for each Discount Rate

Discount Rate = 02.33%		Discount Rate = 02.43%	
New Construction	- $1,881,441,4	New Construction	- $1,859,660,2
Status Quo	- $2,129,569,1	Status Quo	- $2,104,009,7
Renovation	- $2,156,595,2	Renovation	- $2,130,913,4
Discount Rate = 02.53%		**Discount Rate = 02.63%**	
New Construction	- $1,838,267,2	New Construction	- $1,817,254,4
Status Quo	- $2,078,909,1	Status Quo	- $2,054,257,6
Renovation	- $2,105,693,4	Renovation	- $2,080,925,2
Discount Rate = 02.73%		**Discount Rate = 02.83%**	
New Construction	- $1,796,613,6	New Construction	- $1,776,336,9
Status Quo	- $2,030,045,6	Status Quo	- $2,006,263,9
Renovation	- $2,056,599,2	Renovation	- $2,032,706,1
Discount Rate = 02.93%		**Discount Rate = 03.03%**	
New Construction	- $1,756,416,9	New Construction	- $1,736,845,8
Status Quo	- $1,982,903,3	Status Quo	- $1,959,954,9
Renovation	- $2,009,236,7	Renovation	- $1,986,182,0
Discount Rate = 03.10%		**Discount Rate = 03.13%**	
New Construction	- $1,723,349,9	New Construction	- $1,717,616,6
Status Quo	- $1,944,131,7	Status Quo	- $1,937,410,1
Renovation	- $1,970,285,9	Renovation	- $1,963,533,4
Discount Rate = 03.23%		**Discount Rate = 03.33%**	
New Construction	- $1,698,721,9	New Construction	- $1,680,154,8
Status Quo	- $1,915,260,4	Status Quo	- $1,893,497,5
Renovation	- $1,941,282,2	Renovation	- $1,919,420,2
Discount Rate = 03.43%		**Discount Rate = 03.53%**	
New Construction	- $1,661,908,6	New Construction	- $1,643,976,6
Status Quo	- $1,872,113,4	Status Quo	- $1,851,100,1
Renovation	- $1,897,939,2	Renovation	- $1,876,831,2
Discount Rate = 03.63%		**Discount Rate = 03.73%**	
New Construction	- $1,626,352,3	New Construction	- $1,609,029,2
Status Quo	- $1,830,449,9	Status Quo	- $1,810,155,3
Renovation	- $1,856,088,5	Renovation	- $1,835,703,6
Discount Rate = 03.83%		**Discount Rate = 03.88%**	
New Construction	- $1,592,001,4	New Construction	- $1,583,596,2
Status Quo	- $1,790,209,0	Status Quo	- $1,780,364,2
Renovation	- $1,815,668,9	Renovation	- $1,805,780,7

SOURCE DERIVATION OF BENEFITS AND COSTS

BENEFIT ANALYSIS

The qualitative benefits that will be realized as a result of the alternatives were identified and assigned a numeric weight between 1 and 5, 1 being the least important, 5 being the most important. I worked with Mr. Fred Weitelman, Lead Technical Engineer for MAN, to determine the numeric weight. The percentage amount that each alternative meets the objective for each benefit was estimated (100% being the optimum solution, 0% does not meet the objective). The numeric weight was multiplied by the percentage to arrive at the weighted, individual benefit score for each alternative. The individual benefit scores were then added to determine the total benefit score for each alternative.

Benefit Definitions and Ranking:

Benefits are rated based on importance. Below are the definitions of each of the benefits with the corresponding ranking in parentheses.

a. Mission Accomplishment: measures the extent to which the alternative has a positive impact on the 76th Commodities Maintenance Group's mission accomplishment. (5)

b. Accessibility: evaluates the extent to which the facility in a given alternative is accessible to 76th Commodities Maintenance Group handicapped and physically challenged personnel. (3)

c. Facility Adequacy: assesses the extent to which an alternative meets the facility needs of the 76th Commodities Maintenance Group. (3)

d. Health/Safety: measures the degree to which the alternative promotes health and safety of 76th Commodities Maintenance Group personnel . (5)

e. Security: measures the extent to which an alternative enables the 76th Commodities Maintenance Group to protect the resources and personnel it houses. (5)

f. Morale: measures the extent to which the alternative has a positive impact on morale. (1)

SOURCE DERIVATION OF BENEFITS AND COSTS

The results of the benefit analysis are summarized in the following table:

BENEFITS	WEIGHT	ALT 1 STATUS QUO (RAW)	ALT 1 (WTD)	ALT 2 RENOVATION OF EXISTING BUILDING (RAW)	ALT 2 (WTD)	ALT 3 CONSTRUCT NEW FACILITY (RAW)	ALT 3 (WTD)
a. Mission Accomplishment	5	50%	2.50	75%	3.75	100%	5.00
b. Accessibility	3	10%	0.30	75%	2.25	100%	3.00
c. Facility Adequacy	3	0%	0.00	50%	1.50	100%	3.00
d. Health/Safety	5	10%	0.50	75%	3.75	95%	4.75
e. Security	5	30%	1.50	50%	2.50	95%	4.75
f. Morale	1	0%	0.00	75%	0.75	100%	1.00
TOTAL SCORES			**4.80**		**14.50**		**21.50**

Scoring Rationale:

a. Mission Accomplishment: Alternative 1 is rated 50% for this benefit. Although the mission is being satisfactorily performed, the poor layout, excessive travel time for parts and personnel, and degraded facility condition are detrimental to efficient and effective mission accomplishment. Alternative 2 rates somewhat better at 75%, by correcting documented facility deficiencies. However, alternative 2 does not eliminate the need to transport commodity items between buildings. Alternative 3 is scored 100% for this benefit, because it provides the optimum conditions for efficiency by providing a new facility, which can be custom configured for the workload it houses, incorporating the most up to date industrial production methods. Additionally, the new facility will be located adjacent to Building 3902, thereby eliminating the need to transport commodity items over long distances.

b. Accessibility: Alternative 1 earns a score of 10% for accessibility, as there are no external ramps to provide grade level accessibility for handicapped workers. There is also no elevator to permit handicapped access of second floor administrative work areas. Alternative 2 will substantially improve accessibility through the renovation, but will not achieve total accessibility due to the need to reconfigure existing space. Alternative 3 will provide a totally accessible facility by incorporating modern standards into the design, and is therefore scored 100%.

c. Facility Adequacy: A 1991 Corps of Engineers Hazardous Component Study documented the seriously degraded condition of the Building 3108. Despite maintenance and repair expenditures totaling over $15.5 million over the past seven years, this amount of funding was only enough to resolve the most urgent and critical deficiencies. These "band-aid" fixes are a drain on scarce maintenance and repair resources, while still leaving OC-ALC with a facility in generally poor condition. Accordingly, Alternative 1 is rated 0% for this benefit. Alternative 2 is rated 75% for facility adequacy, as the renovation will resolve many of the long standing and serious Life Safety and Uniform Building Code deficiencies. However, the age and configuration of the underlying facility will constrain design and layout. Alternative 3 will provide a newly constructed

facility specifically designed and laid out for the workload it will house, providing the optimum environment for the commodities workload. This "best case" facility scenario is rated 100% for this benefit.

d. Health/Safety: The 1991 Corps of Engineers Hazardous Component Study documented numerous deficiencies in Building 3108 in violation of the Uniform Building Code, Uniform Fire Code, Life Safety Code (NFPA 101), Flammable and Combustible Liquids Code (NFPA 30), and National Electrical Code. Although several million dollars have been invested to correct the deficiencies causing the greatest risk to life and property, the work was not sufficient to completely restore the building to an acceptable condition meeting all code requirements. Alternative 1 was rated 10% for this benefit because the facility is not conducive to the health and safety of its occupants. Alternative 2 meets this benefit 75%, as it will significantly improve the health and safety factors of the facility, due to the extensive renovation and remediation of all code deficiencies. Alternative 3 is scored 95%, as it will provide a new facility, constructed to modern standards, which will provide the best possible environment to promote the health and safety of the personnel who work there.

e. Security: Alternative 1 is rated 30% for security. Building 3108, as currently configured, lacks standard design features which would improve the security environment. There is no central entry for visitor check-in and exterior doors lead directly to interior work areas. Exterior doors are rarely locked during duty hours, and some are not lockable at all. The lack of central corridors makes it impossible to secure equipment from the general population when not in use. The extensive renovation called for in Alternative 2 will correct many security issues; however, the need to for commodities and personnel to travel between facilities creates a potential security risk. This potential risk justifies the score of 50% for this benefit. Alternative 3 will provide a facility designed to incorporate the security features necessary in a post-9/11 environment, earning a score of 95%.

f. Morale: Alternative 1 scores 0% for the morale benefit. Employees work in a cramped, poorly lit, degraded facility. Climate control is poor to non-existent. An uncomfortable and unattractive work environment is not conducive to high morale. Alternative 2 is rated 75% for this benefit, as the renovation will substantially improve the work environment, with a correspondingly favorable impact on morale. Alternative 3 is scored 100% for this benefit. An attractive, well-designed and comfortable facility will have the maximum positive impact on employee morale.

DATE GENERATED: 08 Apr 2005
TIME GENERATED: 12:36:58
VERSION: ECONPACK 3.0.3

Consolidated Fuel Test Repair and Overhaul Final
ECONOMIC ANALYSIS

EXECUTIVE SUMMARY REPORT

PROJECT TITLE : WWYK043008
DISCOUNT RATE : 3.1%
PERIOD OF ANALYSIS : 28 Years
START YEAR : 2008
BASE YEAR : 2008
REPORT OUTPUT : Constant Dollars

PROJECT OBJECTIVE:

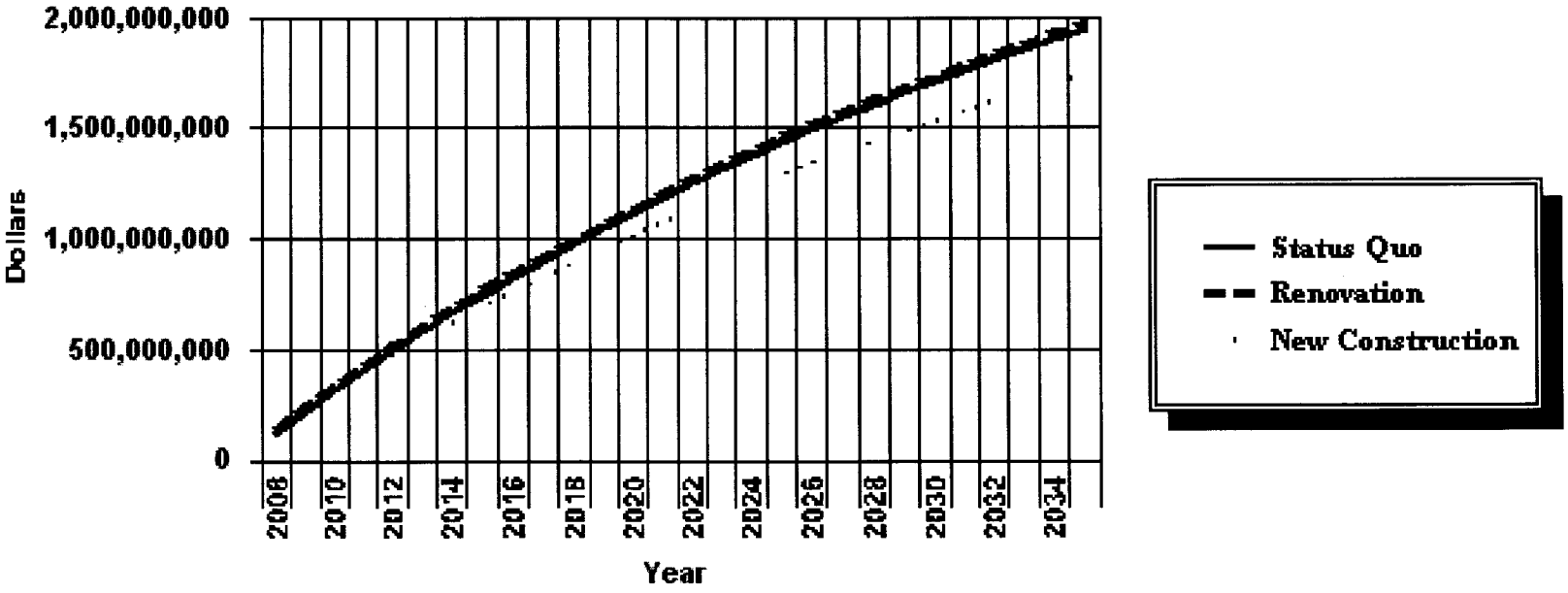
Determine the most cost effective means to provide 140,000 sq.ft of industrial space for the fuel control test, repair and overhaul function.

ECONOMIC INDICATORS:

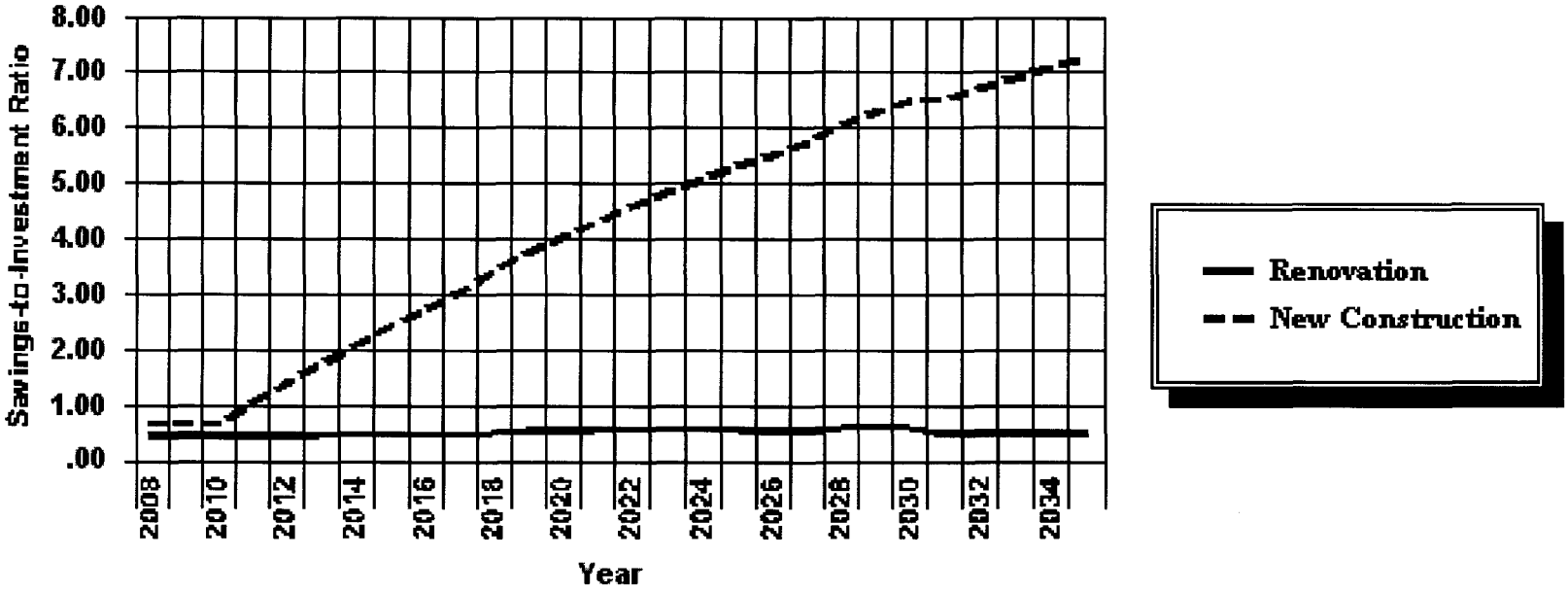
ALTERNATIVE NAME	NPV	SIR	DPP	BIR
Status Quo	$1,944,131,766	N/A	N/A	N/A
Renovation	$1,970,285,926	0.5	N/A	N/A
New Construction	$1,723,349,932	7.3	3.9 YEARS	N/A

ACTION OFFICER: Deborah Tomlinson
PHONE NUMBER : (405) 739-7373
EMAIL ADDRESS : deborah.tomlinson@tinker.af.mil
ORGANIZATION : OC-ALC/FMC

ECONOMIC ANALYSIS GRAPH 1
Cumulative Net Present Value



SIR ECONOMIC ANALYSIS GRAPH 1
SIR Vs. Years



LIFE CYCLE COST REPORT

Status Quo

YEAR	Transportation Time (1)	Annual Maintenance (2)	Periodic Maintenance (3)	Utilities (4)	Equipment Recapitaliza (5)
2008	$42,413	$258,626	$7,622,942	$44,305	$7,536,000
2009	$42,413	$258,626	$0	$44,305	$0
2010	$42,413	$258,626	$0	$44,305	$0
2011	$42,413	$258,626	$0	$44,305	$0
2012	$42,413	$258,626	$0	$44,305	$0
2013	$42,413	$258,626	$0	$44,305	$0
2014	$42,413	$258,626	$0	$44,305	$0
2015	$42,413	$258,626	$0	$44,305	$0
2016	$42,413	$258,626	$0	$44,305	$0
2017	$42,413	$258,626	$0	$44,305	$0
2018	$42,413	$258,626	$3,311,446	$44,305	$0
2019	$42,413	$258,626	$1,924,116	$44,305	$0
2020	$42,413	$258,626	$0	$44,305	$0
2021	$42,413	$258,626	$3,776,969	$44,305	$0
2022	$42,413	$258,626	$0	$44,305	$0
2023	$42,413	$258,626	$199,589	$44,305	$0
2024	$42,413	$258,626	$0	$44,305	$0
2025	$42,413	$258,626	$0	$44,305	$0
2026	$42,413	$258,626	$0	$44,305	$0
2027	$42,413	$258,626	$0	$44,305	$0
2028	$42,413	$258,626	$6,603,822	$44,305	$0
2029	$42,413	$258,626	$0	$44,305	$0
2030	$42,413	$258,626	$0	$44,305	$0
2031	$42,413	$258,626	$0	$44,305	$0
2032	$42,413	$258,626	$0	$44,305	$0
2033	$42,413	$258,626	$0	$44,305	$0
2034	$42,413	$258,626	$0	$44,305	$0
2035	$42,413	$258,626	$0	$44,305	$0
%NPV	0.04	0.25	0.90	0.04	0.38
	$798,292	$4,867,827	$17,422,494	$833,903	$7,421,839
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	Investment Costs

LIFE CYCLE COST REPORT

Status Quo

YEAR	Direct Labor (6)	Direct Material (7)	Overhead (8)	COE Recommended Repair (9)	TOTAL ANNUAL OUTLAYS
2008	$15,871,531	$58,100,642	$27,249,176	$7,728,598	$124,454,233
2009	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2010	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2011	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2012	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2013	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2014	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2015	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2016	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2017	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2018	$15,871,531	$58,100,642	$27,249,176	$0	$104,878,139
2019	$15,871,531	$58,100,642	$27,249,176	$0	$103,490,809
2020	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2021	$15,871,531	$58,100,642	$27,249,176	$0	$105,343,662
2022	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2023	$15,871,531	$58,100,642	$27,249,176	$0	$101,766,282
2024	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2025	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2026	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2027	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2028	$15,871,531	$58,100,642	$27,249,176	$0	$108,170,515
2029	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2030	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2031	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2032	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2033	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2034	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
2035	$15,871,531	$58,100,642	$27,249,176	$0	$101,566,693
%NPV	15.37	56.25	26.38	0.39	
	$298,732,021	$1,093,563,200	$512,880,668	$7,611,520	
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Investment Costs	

LIFE CYCLE COST REPORT

Status Quo

YEAR	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2008	0.985	$122,568,915	$122,568,915
2009	0.955	$97,020,457	$219,589,371
2010	0.927	$94,103,256	$313,692,627
2011	0.899	$91,273,769	$404,966,396
2012	0.872	$88,529,359	$493,495,754
2013	0.845	$85,867,467	$579,363,222
2014	0.820	$83,285,613	$662,648,835
2015	0.795	$80,781,390	$743,430,225
2016	0.771	$78,352,464	$821,782,689
2017	0.748	$75,996,570	$897,779,259
2018	0.726	$76,114,778	$973,894,037
2019	0.704	$72,849,593	$1,046,743,630
2020	0.683	$69,345,454	$1,116,089,084
2021	0.662	$69,761,600	$1,185,850,684
2022	0.642	$65,238,004	$1,251,088,688
2023	0.623	$63,400,779	$1,314,489,467
2024	0.604	$61,373,845	$1,375,863,313
2025	0.586	$59,528,463	$1,435,391,776
2026	0.568	$57,738,567	$1,493,130,343
2027	0.551	$56,002,490	$1,549,132,833
2028	0.535	$57,850,386	$1,606,983,219
2029	0.519	$52,685,367	$1,659,668,586
2030	0.503	$51,101,229	$1,710,769,815
2031	0.488	$49,564,722	$1,760,334,537
2032	0.473	$48,074,415	$1,808,408,953
2033	0.459	$46,628,919	$1,855,037,872
2034	0.445	$45,226,886	$1,900,264,757
2035	0.432	$43,867,008	$1,944,131,766

3.1% DISCOUNT RATE, 28 YEARS

Renovation

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communications (3)	Transportation Time (4)	Annual Maintenance (5)
2008	$45,500,000	$0	$1,464,000	$42,413	$258,626
2009	$0	$0	$0	$42,413	$258,626
2010	$0	$0	$0	$42,413	$258,626
2011	$0	$0	$0	$42,413	$0
2012	$0	$0	$0	$42,413	$81,083
2013	$0	$0	$0	$42,413	$81,083
2014	$0	$0	$0	$42,413	$81,083
2015	$0	$0	$0	$42,413	$81,083
2016	$0	$0	$0	$42,413	$81,083

LIFE CYCLE COST REPORT

Renovation

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communica-tions (3)	Transportation Time (4)	Annual Maintenance (5)
2008	$45,500,000	$0	$1,464,000	$42,413	$258,626
2009	$0	$0	$0	$42,413	$258,626
2010	$0	$0	$0	$42,413	$258,626
2011	$0	$0	$0	$42,413	$0
2012	$0	$0	$0	$42,413	$81,083
2013	$0	$0	$0	$42,413	$81,083
2014	$0	$0	$0	$42,413	$81,083
2015	$0	$0	$0	$42,413	$81,083
2016	$0	$0	$0	$42,413	$81,083
2017	$0	$0	$0	$42,413	$81,083
2018	$0	$0	$0	$42,413	$81,083
2019	$0	$0	$0	$42,413	$81,083
2020	$0	$0	$0	$42,413	$81,083
2021	$0	$0	$0	$42,413	$81,083
2022	$0	$7,536,000	$0	$42,413	$113,516
2023	$0	$0	$0	$42,413	$113,516
2024	$0	$0	$0	$42,413	$113,516
2025	$0	$0	$0	$42,413	$113,516
2026	$0	$0	$0	$42,413	$113,516
2027	$0	$0	$0	$42,413	$113,516
2028	$0	$0	$0	$42,413	$113,516
2029	$0	$0	$0	$42,413	$113,516
2030	$0	$0	$0	$42,413	$113,516
2031	$0	$0	$0	$42,413	$154,058
2032	$0	$0	$0	$42,413	$154,058
2033	$0	$0	$0	$42,413	$154,058
2034	$0	$0	$0	$42,413	$154,058
2035	$0	$0	$0	$42,413	$154,058
%NPV	2.27	0.25	0.07	0.04	0.12
	$44,810,735	$4,840,500	$1,441,822	$798,292	$2,296,337
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Investment Costs	Investment Costs	Investment Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

Renovation

YEAR	Periodic Maintenance (6)	Utilities (7)	Direct Labor (8)	Direct Material (9)	Overhead (10)
2008	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2009	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2010	$0	$44,305	$15,871,531	$58,100,642	$27,249,176
2011	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2012	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2013	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2014	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2015	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2016	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2017	$0	$42,601	$15,871,531	$58,100,642	$27,249,176
2018	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2019	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2020	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2021	$3,311,446	$39,986	$15,871,531	$58,100,642	$27,249,176
2022	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2023	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2024	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2025	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2026	$3,420,651	$39,986	$15,871,531	$58,100,642	$27,249,176
2027	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2028	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2029	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2030	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2031	$12,304,907	$39,986	$15,871,531	$58,100,642	$27,249,176
2032	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2033	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2034	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
2035	$0	$39,986	$15,871,531	$58,100,642	$27,249,176
%NPV	0.51	0.04	15.16	55.50	26.03
	$10,142,320	$780,031	$298,732,021	$1,093,563,200	$512,880,668
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

Renovation

YEAR	TOTAL ANNUAL OUTLAYS	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2008	$148,530,693	0.985	$146,280,648	$146,280,648
2009	$101,566,693	0.955	$97,020,457	$243,301,104
2010	$101,566,693	0.927	$94,103,256	$337,404,360
2011	$101,306,363	0.899	$91,039,821	$428,444,181
2012	$101,387,446	0.872	$88,373,120	$516,817,301
2013	$101,387,446	0.845	$85,715,927	$602,533,228
2014	$101,387,446	0.820	$83,138,629	$685,671,857
2015	$101,387,446	0.795	$80,638,825	$766,310,682
2016	$101,387,446	0.771	$78,214,186	$844,524,868
2017	$101,387,446	0.748	$75,862,450	$920,387,318
2018	$101,384,831	0.726	$73,579,528	$993,966,846
2019	$101,384,831	0.704	$71,367,146	$1,065,333,992
2020	$101,384,831	0.683	$69,221,286	$1,134,555,278
2021	$104,696,277	0.662	$69,332,883	$1,203,888,161
2022	$108,953,264	0.642	$69,982,524	$1,273,870,684
2023	$101,417,264	0.623	$63,183,340	$1,337,054,024
2024	$101,417,264	0.604	$61,283,550	$1,398,337,574
2025	$101,417,264	0.586	$59,440,882	$1,457,778,456
2026	$104,837,915	0.568	$59,598,190	$1,517,376,646
2027	$101,417,264	0.551	$55,920,097	$1,573,296,743
2028	$101,417,264	0.535	$54,238,698	$1,627,535,440
2029	$101,417,264	0.519	$52,607,854	$1,680,143,294
2030	$101,417,264	0.503	$51,026,047	$1,731,169,341
2031	$113,762,713	0.488	$55,516,401	$1,786,685,742
2032	$101,457,806	0.473	$48,022,876	$1,834,708,618
2033	$101,457,806	0.459	$46,578,929	$1,881,287,548
2034	$101,457,806	0.445	$45,178,399	$1,926,465,947
2035	$101,457,806	0.432	$43,819,980	$1,970,285,926

3.1% DISCOUNT RATE, 28 YEARS

2015	$101,566,693	$101,387,446	$179,247	0.795	$142,565
2016	$101,566,693	$101,387,446	$179,247	0.771	$138,278

PRIMARY ECONOMIC ANALYSIS

Status Quo Alternative: Status Quo
Proposed Alternative : Renovation

Project Year(s)	Recurring Operating Costs Status Quo Alternative	Annual Costs Proposed Alternative	Differential Costs	Present Value Factor	Present Value of Differential Costs
2008	$109,189,635	$101,566,693	$7,622,942	0.985	$7,507,464
2009	$101,566,693	$101,566,693	$0	0.955	$0
2010	$101,566,693	$101,566,693	$0	0.927	$0
2011	$101,566,693	$101,306,363	$260,330	0.899	$233,948
2012	$101,566,693	$101,387,446	$179,247	0.872	$156,238
2013	$101,566,693	$101,387,446	$179,247	0.845	$151,541
2014	$101,566,693	$101,387,446	$179,247	0.820	$146,984
2015	$101,566,693	$101,387,446	$179,247	0.795	$142,565
2016	$101,566,693	$101,387,446	$179,247	0.771	$138,278
2017	$101,566,693	$101,387,446	$179,247	0.748	$134,120
2018	$104,878,139	$101,384,831	$3,493,308	0.726	$2,535,251
2019	$103,490,809	$101,384,831	$2,105,978	0.704	$1,482,447
2020	$101,566,693	$101,384,831	$181,862	0.683	$124,168
2021	$105,343,662	$104,696,277	$647,385	0.662	$428,717
2022	$101,566,693	$101,417,264	$149,429	0.642	$95,981
2023	$101,766,282	$101,417,264	$349,018	0.623	$217,440
2024	$101,566,693	$101,417,264	$149,429	0.604	$90,296
2025	$101,566,693	$101,417,264	$149,429	0.586	$87,581
2026	$101,566,693	$104,837,915	-$3,271,222	0.568	-$1,859,622
2027	$101,566,693	$101,417,264	$149,429	0.551	$82,393
2028	$108,170,515	$101,417,264	$6,753,251	0.535	$3,611,688
2029	$101,566,693	$101,417,264	$149,429	0.519	$77,513
2030	$101,566,693	$101,417,264	$149,429	0.503	$75,182
2031	$101,566,693	$113,762,713	-$12,196,020	0.488	-$5,951,679
2032	$101,566,693	$101,457,806	$108,887	0.473	$51,539
2033	$101,566,693	$101,457,806	$108,887	0.459	$49,990
2034	$101,566,693	$101,457,806	$108,887	0.445	$48,487
2035	$101,566,693	$101,457,806	$108,887	0.432	$47,029
Totals	$2,867,306,288	$2,858,951,852	$8,354,436		$9,905,537

PRIMARY ECONOMIC ANALYSIS

Total present value of investment	$51,093,057
Plus: present value of existing assets to be used	$0
Less: present value of existing assets replaced	$0
Less: present value of proposed alternative salvage value	$0
Total present value of net investment	$51,093,057
Total present value of differential costs	$9,905,537
Plus: present value of status quo investment costs eliminated	$15,033,359
Less: present value of status quo salvage value	$0
Total present value of savings	$24,938,896
Savings/Investment Ratio	0.5

SIR is less than one at end of period of analysis

For Status Quo:

Recurring Costs:
- Transportation Time
- Annual Maintenance
- Periodic Maintenance
- Utilities
- Direct Labor
- Direct Material
- Overhead

Investment Costs:
- Equipment Recapitalization
- COE Recommended Repair

For Proposed Alternative:

Recurring Costs:
- Transportation Time
- Annual Maintenance
- Periodic Maintenance
- Utilities
- Direct Labor
- Direct Material
- Overhead

Investment Costs:
- Initial Construction
- Initial Operating Equipment
- Communica- tions

LIFE CYCLE COST REPORT

New Construction

YEAR	Initial Construction (1)	Initial Operating Equipment (2)	Communications (3)	Utilities (4)	Annual Maintenance (5)
2008	$35,000,000	$7,536,000	$1,464,000	$44,305	$258,626
2009	$0	$0	$0	$44,305	$258,626
2010	$0	$0	$0	$44,305	$258,626
2011	$0	$0	$0	$40,822	$0
2012	$0	$0	$0	$40,822	$86,383
2013	$0	$0	$0	$40,822	$86,383
2014	$0	$0	$0	$40,822	$86,383
2015	$0	$0	$0	$40,822	$86,383
2016	$0	$0	$0	$40,822	$86,383
2017	$0	$0	$0	$40,822	$86,383
2018	$0	$0	$0	$40,822	$86,383
2019	$0	$0	$0	$40,822	$86,383
2020	$0	$0	$0	$40,822	$86,383
2021	$0	$0	$0	$40,822	$86,383
2022	$0	$0	$0	$40,822	$120,936
2023	$0	$0	$0	$40,822	$120,936
2024	$0	$0	$0	$40,822	$120,936
2025	$0	$0	$0	$40,822	$120,936
2026	$0	$0	$0	$40,822	$120,936
2027	$0	$0	$0	$40,822	$120,936
2028	$0	$0	$0	$40,822	$120,936
2029	$0	$0	$0	$40,822	$120,936
2030	$0	$0	$0	$40,822	$120,936
2031	$0	$0	$0	$40,822	$164,128
2032	$0	$0	$0	$40,822	$164,128
2033	$0	$0	$0	$40,822	$164,128
2034	$0	$0	$0	$40,822	$164,128
2035	$0	$0	$0	$40,822	$164,128
%NPV	2.00	0.43	0.08	0.05	0.14
	$34,469,796	$7,421,839	$1,441,822	$778,331	$2,397,977
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	M-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation
CATEGORY/ RES SCHD	Investment Costs	Investment Costs	Investment Costs	Recurring Costs	Recurring Costs

LIFE CYCLE COST REPORT

New Construction

YEAR	Periodic Maintenance (6)	Direct Labor (7)	Direct Material (8)	Overhead (9)	TOTAL ANNUAL OUTLAYS
2008	$0	$15,871,531	$58,100,642	$27,249,176	$145,524,280
2009	$0	$15,871,531	$58,100,642	$27,249,176	$101,524,280
2010	$0	$15,871,531	$58,100,642	$27,249,176	$101,524,280
2011	$0	$13,252,728	$49,385,546	$24,115,521	$86,794,617
2012	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2013	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2014	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2015	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2016	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2017	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2018	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2019	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2020	$0	$13,252,728	$49,385,546	$24,115,521	$86,881,000
2021	$3,477,873	$13,252,728	$49,385,546	$24,115,521	$90,358,873
2022	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2023	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2024	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2025	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2026	$3,574,468	$13,252,728	$49,385,546	$24,115,521	$90,490,021
2027	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2028	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2029	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2030	$0	$13,252,728	$49,385,546	$24,115,521	$86,915,553
2031	$12,875,746	$13,252,728	$49,385,546	$24,115,521	$99,834,491
2032	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2033	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2034	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
2035	$0	$13,252,728	$49,385,546	$24,115,521	$86,958,745
%NPV	0.62	14.91	55.39	26.86	
	$10,618,545	$256,948,310	$954,511,481	$462,882,354	
DISCOUNTING CONVENTION	M-O-Y	M-O-Y	M-O-Y	M-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	
CATEGORY/ RES SCHD	Recurring Costs	Recurring Costs	Recurring Costs	Recurring Costs	

YEAR	DISCOUNT FACTORS	VALUE	VALUE	(1)	VALUE
2008	0.985	$143,319,778	$143,319,778	$0	$143,319,778
2009	0.955	$96,979,942	$240,299,720	$0	$240,299,720

LIFE CYCLE COST REPORT

New Construction

YEAR	MIDDLE OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE PRESENT VALUE	Residual Value (1)	CUMULATIVE NET PRESENT VALUE
2008	0.985	$143,319,778	$143,319,778	$0	$143,319,778
2009	0.955	$96,979,942	$240,299,720	$0	$240,299,720
2010	0.927	$94,063,959	$334,363,679	$0	$334,363,679
2011	0.899	$77,998,718	$412,362,397	$30,413,364	$381,949,033
2012	0.872	$75,728,755	$488,091,152	$28,952,620	$459,138,532
2013	0.845	$73,451,751	$561,542,903	$27,552,226	$533,990,677
2014	0.820	$71,243,211	$632,786,114	$26,209,870	$606,576,244
2015	0.795	$69,101,078	$701,887,192	$24,923,328	$676,963,864
2016	0.771	$67,023,354	$768,910,546	$23,690,458	$745,220,088
2017	0.748	$65,008,103	$833,918,648	$22,509,194	$811,409,454
2018	0.726	$63,053,446	$896,972,094	$21,377,549	$875,594,545
2019	0.704	$61,157,561	$958,129,656	$20,293,604	$937,836,051
2020	0.683	$59,318,682	$1,017,448,338	$19,255,518	$998,192,820
2021	0.662	$59,838,242	$1,077,286,580	$18,261,511	$1,059,025,068
2022	0.642	$55,827,329	$1,133,113,909	$17,309,871	$1,115,804,037
2023	0.623	$54,148,719	$1,187,262,628	$16,398,949	$1,170,863,678
2024	0.604	$52,520,581	$1,239,783,208	$15,527,155	$1,224,256,054
2025	0.586	$50,941,398	$1,290,724,606	$14,692,962	$1,276,031,644
2026	0.568	$51,441,708	$1,342,166,314	$13,894,896	$1,328,271,418
2027	0.551	$47,924,051	$1,390,090,366	$13,131,540	$1,376,958,826
2028	0.535	$46,483,076	$1,436,573,441	$12,401,526	$1,424,171,916
2029	0.519	$45,085,428	$1,481,658,869	$11,703,538	$1,469,955,331
2030	0.503	$43,729,804	$1,525,388,673	$11,036,315	$1,514,352,358
2031	0.488	$48,719,405	$1,574,108,078	$10,398,634	$1,563,709,444
2032	0.473	$41,160,057	$1,615,268,134	$9,789,323	$1,605,478,811
2033	0.459	$39,922,460	$1,655,190,595	$9,207,252	$1,645,983,342
2034	0.445	$38,722,076	$1,693,912,671	$8,651,335	$1,685,261,336
2035	0.432	$37,557,785	$1,731,470,456	$8,120,523	$1,723,349,932
%NPV				-0.47	
				$8,120,523	
DISCOUNTING CONVENTION				E-O-Y	
INFLATION INDEX				No Inflation	
			Straight Line		

3.1% DISCOUNT RATE, 28 YEARS

PRIMARY ECONOMIC ANALYSIS

Status Quo Alternative: Status Quo
Proposed Alternative : New Construction

Project Year(s)	Recurring Operating Costs Status Quo Alternative	Recurring Operating Costs Proposed Alternative	Differential Costs	Present Value Factor	Present Value of Differential Costs
2008	$109,189,635	$101,524,280	$7,665,355	0.985	$7,549,235
2009	$101,566,693	$101,524,280	$42,413	0.955	$40,515
2010	$101,566,693	$101,524,280	$42,413	0.927	$39,296
2011	$101,566,693	$86,794,617	$14,772,076	0.899	$13,275,051
2012	$101,566,693	$86,881,000	$14,685,693	0.872	$12,800,604
2013	$101,566,693	$86,881,000	$14,685,693	0.845	$12,415,716
2014	$101,566,693	$86,881,000	$14,685,693	0.820	$12,042,402
2015	$101,566,693	$86,881,000	$14,685,693	0.795	$11,680,312
2016	$101,566,693	$86,881,000	$14,685,693	0.771	$11,329,110
2017	$101,566,693	$86,881,000	$14,685,693	0.748	$10,988,467
2018	$104,878,139	$86,881,000	$17,997,139	0.726	$13,061,333
2019	$103,490,809	$86,881,000	$16,609,809	0.704	$11,692,032
2020	$101,566,693	$86,881,000	$14,685,693	0.683	$10,026,772
2021	$105,343,662	$90,358,873	$14,984,789	0.662	$9,923,358
2022	$101,566,693	$86,915,553	$14,651,140	0.642	$9,410,675
2023	$101,766,282	$86,915,553	$14,850,729	0.623	$9,252,060
2024	$101,566,693	$86,915,553	$14,651,140	0.604	$8,853,265
2025	$101,566,693	$86,915,553	$14,651,140	0.586	$8,587,066
2026	$101,566,693	$90,490,021	$11,076,672	0.568	$6,296,859
2027	$101,566,693	$86,915,553	$14,651,140	0.551	$8,078,439
2028	$108,170,515	$86,915,553	$21,254,962	0.535	$11,367,310
2029	$101,566,693	$86,915,553	$14,651,140	0.519	$7,599,939
2030	$101,566,693	$86,915,553	$14,651,140	0.503	$7,371,425
2031	$101,566,693	$99,834,491	$1,732,202	0.488	$845,318
2032	$101,566,693	$86,958,745	$14,607,948	0.473	$6,914,359
2033	$101,566,693	$86,958,745	$14,607,948	0.459	$6,706,459
2034	$101,566,693	$86,958,745	$14,607,948	0.445	$6,504,810
2035	$101,566,693	$86,958,745	$14,607,948	0.432	$6,309,224
Totals	$2,867,306,288	$2,497,139,246	$370,167,042		$240,961,408

PRIMARY ECONOMIC ANALYSIS

Total present value of investment	$43,333,458
Plus: present value of existing assets to be used	$0
Less: present value of existing assets replaced	$0
Less: present value of proposed alternative salvage value	$8,120,523
Total present value of net investment	$35,212,934
Total present value of differential costs	$240,961,408
Plus: present value of status quo investment costs eliminated	$15,033,359
Less: present value of status quo salvage value	$0
Total present value of savings	$255,994,768
Savings/Investment Ratio	7.3
Discounted Payback Period	3.9 Years

For Status Quo:

Recurring Costs:	Transportation Time
	Annual Maintenance
	Periodic Maintenance
	Utilities
	Direct Labor
	Direct Material
	Overhead
Investment Costs:	Equipment Recapitalization
	COE Recommended Repair

For Proposed Alternative:

Recurring Costs:	Utilities
	Annual Maintenance
	Periodic Maintenance
	Direct Labor
	Direct Material
	Overhead
Investment Costs:	Initial Construction
	Initial Operating Equipment
	Communica- tions

1. COMPONENT	FY 2008 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
AIR FORCE	(computer generated)	

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
TINKER AIR FORCE BASE, OKLAHOMA	CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
72896	211-254	WWYK043008	35,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST
CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FAC				22,462
OVERHAUL SHOPS	SM	3,037	1,576	(4,786)
FUEL CONTROL CLEAN AREA	SM	1,121	2,178	(2,442)
TEST SUPPORT AREA	SM	836	2,008	(1,679)
FLAMMABLE FUELS TEST AREA	SM	4,833	1,826	(8,825)
ADMINISTRATIVE SUPORT	SM	3,160	1,427	(4,509)
ANTITERRORISM FORCE PROTECTION	SM	12,987	17	(221)
SUPPORTING FACILITIES				8,938
UTILITIES	LS			(1,073)
PAVEMENT	LS			(429)
SITE IMPROVEMENTS	LS			(2,178)
ELECTRICAL SERVICE	LS			(2,575)
AIR CONDITIONING PLANT	LS			(751)
STORM DRAINAGE	LS			(215)
FUEL STORAGE TANKS	LS			(536)
DRILLED PIERS	LS			(644)
COMMUNUCATIONS	LS			(536)
SUBTOTAL				31,399
CONTINGENCY (5.0 %)				1,570
TOTAL CONTRACT COST				32,969
SUPERVISION, INSPECTION AND OVERHEAD (5.7 %)				1,879
TOTAL REQUEST				34,849
TOTAL REQUEST (ROUNDED)				35,000
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(9,000)

10. Description of Proposed Construction: Drilled piers with concrete slab, masonry walls, structural steel frame, exterior brick veneer finish and sloped metal roof. The facility will provide space for shops, controlled areas, and administrative support. Include pavements and site improvements, utilities, exterior lighting, and fire protection. . Comply with United Facilities Criteria 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, 8 Oct 2003.

11. REQUIREMENT: 62,938 SM ADEQUATE: 49,951 SM SUBSTANDARD: 12,987 SM

PROJECT: Construct a Consolidated Fuel Overhaul, Repair and Test Facility. (Current Mission) . Comply with United Facilities Criteria 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, 8 Oct 2003.

REQUIREMENT: A consolidated facility is required to provide a reliable and responsive organic source of repair for first line weapons systems to integrate, repair, overhaul and test aircraft fuel control accessories in support of the A-10, B-1B,B2-B,B-52H,C-

1. COMPONENT AIR FORCE	FY 2008 MILITARY CONSTRUCTION PROJECT DATA (computer generated)		2. DATE
3. INSTALLATION AND LOCATION TINKER AIR FORCE BASE, OKLAHOMA		4. PROJECT TITLE CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY	
5. PROGRAM ELEMENT 72896	6. CATEGORY CODE 211-254	7. PROJECT NUMBER WWYK043008	8. PROJECT COST ($000) 35,000

130,C-135,C-141,CH-53,E-3,F-14,F-15,F-16 and T-37 aircraft. The facility requires conventional space as well as controlled areas including a Class 300,000 clean room and Class 1 Div 1 flammable fuels hazardous test areas with special electrical considerations. A facility with modern equipment and renovated space is essential to provide the proper controlled atmospheres for fuel control overhaul and repair. Comply with DoD force protection requirements per unified facilities criteria.

CURRENT SITUATION: The fuel controls repair, overhaul, and testing are conducted in two separate facilities constructed in 1943. These facilities are the only source of repair and test for many DoD aircraft fuel controls. Items are repaired and overhauled in a 300,000 class environmental controlled area in building 3001. This controlled area is in need of a $1.5M major renovation to bring it up to current standards. After the components are repaired and overhauled, they are transported approximately one quarter of a mile to building 3108 for final testing and acceptance. Building 3108 is constructed with asbestos siding, contains electrical systems that are outdated and need modernization, and lacks hazardous material spill containment as required by the Uniform Building Code and the National Fire Code. Significant time loss occurs throughout the process as a result of parts being transported back and forth between buildings. This time loss causes delays in meeting necessary production schedules and keeps aircraft out of service for a longer period of time. The consolidation and construction of a new facility will increase the efficiency of the process by 20% with a payback period of 1.51 years.

IMPACT IF NOT PROVIDED: Fuels personnel will be continue to be housed in substandard, outdated and inefficient facilities. Existing work areas will be inadequate to accommodate the modern equipment required to efficiently process the fuels controls. Geographically separated facilities will continue to impact process timelines and delay the return of aircraft to operational status. Cost savings due to the improved efficiencies of the consolidated facility will not be realized. In the event of a catastrophic failure in the existing facilities many aircraft will be grounded.

ADDITIONAL: There is no criteria/scope for this project specified in Air Force Handbook 32-1084, "Facility Requirements." An economic analysis has been prepared comparing the alternatives of new construction, renovation, out-contracting and status quo operation. Based on the net present values and benefits of the respective alternatives, new construction was found to be the most cost efficient over the life of the project with a savings to investment ratio (SIR) of 7.3 and a payback of 3.9 years. Base Civil Engineer: Mr. Stephen P. Mallot (405) 734-3451. Fuel Overhaul, Repair, and Test Fac: 12,987 SM ; Overhaul Shops 3,037 SM ; Fuel Control Clean 1,121 SM ; Test Support 836 SM; Flammable Fuels Test Area 4,833; Administrative 3,160 SM .

JOINT USE CERTIFICATION: This facility can be used by other components on an "as available" basis; however, the scope of the project is based on Air Force requirements.

1. COMPONENT	FY 2008 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
AIR FORCE	(computer generated)	

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
TINKER AIR FORCE BASE, OKLAHOMA	CONSOLIDATED FUEL OVERHAUL, REPAIR & TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
72896	211-254	WWYK043008	35,000

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Project to be accomplished by design-build procedures

(2) Basis:

(a) Standard or Definitive Design - NO

(b) Where Design Was Most Recently Used -

(3) All Other Design Costs

(4) Construction Contract Award

(5) Construction Start

(6) Construction Completion

(7) Energy Study/Life-Cycle analysis was/will be performed NO

b. Equipment associated with this project provided from other appropriations:

EQUIPMENT NOMENCLATURE	PROCURING APPRO	FISCAL YEAR APPROPRIATED OR REQUESTED	COST ($000)
INITIAL OUTFITTING EQUIPMENT	3010	2008	7,536
COMMUNICATIONS FROM STEM-B	3010	2008	1,464

Tomlinson Deborah L Civ OC-ALC/FMC

From: Dell Harry J Contr 72 ABW/CEC

Sent: Monday, January 24, 2005 6:23 AM

To: Gaughran Gary L CIV OC-ALC/FMC

Cc: Grimes Jim D Civ OC-ALC/FMC; Tomlinson Deborah L Civ OC-ALC/FMC; Fox Larry Civ AETC CONS/LGCK; McKee John M Civ OC-ALC/FMA; King Thelma J Civ OC-ALC/FMC; Powell Paul A Civ 72 ABW/CECED; Powell Paul A Civ 72 ABW/CECED; Lee Stephen W Contr 72 ABW/CEC

Subject: Renovation costs versus new construction for Economic Analysis

Signed By: harry.dell@tinker.af.mil

Importance: High

Gary -

It is estimated that the renovation alternative will cost 1.3 times the new construction alternative because you must first "tear down" and then rebuild.

V/R

Harry
72 ABW/CECR
DSN 884-5238
Phone:405-734-5238
FAX:405-734-5538

CONSOLIDATED FUELS TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: STATUS QUO

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT			1.85
NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
TOTAL ANNUAL MAINTENANCE COST	YEAR $s	FY05	$ 243,108.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $		$ 258,626.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 1942

DATA SOURCE:
Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT			$ 10.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,412,657.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,532,166.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2028	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2018	2028	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT			$6.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$887,017.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$962,058.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2018	2028	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

CEILING FINISHES

M&R COST PER SQUARE FOOT				$3.51
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$461,249.10
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$500,270.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2008	
LIFE EXPECTANCY: 10				

YEARS M&R WOULD BE REQUIRED:

2018	2028	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT				$13.50
NUMBER OF SQUARE FEET SPACE				131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,924,116.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			1999	
LIFE EXPECTANCY: 20				

YEARS M&R WOULD BE REQUIRED:

2019	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT				$9.40
NUMBER OF SQUARE FEET SPACE				131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,235,254.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,339,755.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2008	
LIFE EXPECTANCY: 30				

YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,482,365.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,776,969.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2001
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2021	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$755,607.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$819,531.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2038	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,622,913.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,760,210.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2028	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: STATUS QUO

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE YARD				$6.76
NUMBER OF SQUARE YARDS SPACE				27,222
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$184,020.72
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$199,589.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2008

LIFE EXPECTANCY: 15

YEARS M&R WOULD BE REQUIRED:

2023	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: STATUS QUO

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		**PROGRAM YEAR**		**2008**							
ANALYSIS PERIOD (YEARS)	28										
ECONOMIC LIFE OF FACILITY - 55 YEARS	**STOCK NUMBER**	**EST**	**OSD RAW**	**COST**	**# UNITS**	**EST TOT REP**	**USEFUL LIFE**	**YEAR LAST**	**YR REP**	**YR REP**	**YR REP**
ITEM	**PART NUMBER**	**COST**	**INFL INDEX**	**PROG YR $**		**PROG YR $**	**(YEARS)**	**REPLACED**	**REQ**	**REQ**	**REQ**
ROOFING	NA	$1,412,658	0.922	$1,532,166	1	$1,532,166	20	2008	2028	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	10	2008	2018	2028	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$887,018	0.922	$962,058	1	$962,058	10	2008	2018	2028	NA
CEILING FINISHES	NA	$461,249	0.922	$425,272	1	$425,272	10	2008	2018	2028	NA
HVAC	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	20	1999	2019	NA	NA
PLUMBING	NA	$1,235,254	0.922	$1,339,755	1	$1,339,755	30	2008	2038	NA	NA
ELECTRICAL	NA	$3,776,969	0.922	$3,776,969	1	$3,776,969	20	2001	2021	NA	NA
FIRE PROTECTION AND DETECTION	NA	$755,608	0.922	$819,531	1	$819,531	30	2008	2038	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,622,914	0.922	$1,760,210	1	$1,760,210	20	2008	2028	NA	NA
CONCRETE/ASPHALT PAVING	NA	$184,021	0.922	$199,589	1	$199,589	15	2008	2023	NA	NA
		EST	**USAF RAW**	**COST**	**# UNITS**	**EST TOT REP**	**USEFUL LIFE**	**YEAR**	**YR REP**	**YR REP**	**YR REP**
		COST	**INFL FACTOR**	**PROG YR $**		**PROG YR $**	**(YEARS)**	**PURCHASED**	**REQ**	**REQ**	**REQ**
INPUT ADDITIONAL ITEMS HERE:											
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ROOFING	$1,532,166	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$962,058	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058
CEILING FINISHES	$425,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425,272
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$819,531	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$1,760,210	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$199,589	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	**$7,622,942**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$3,311,446**
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: STATUS QUO

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS																	
ANALYSIS PERIOD (YEARS)																	
ECONOMIC LIFE OF FACILITY - 55 YEARS	**YR REP**	**YR REP**	**YR REP**	**YR REP**	**YR REP**	**YR REP**											
ITEM	**REQ**	**REQ**	**REQ**	**REQ**	**REQ**	**REQ**											
ROOFING	NA	NA	NA	NA	NA	NA											
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA	NA											
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA	NA											
CEILING FINISHES	NA	NA	NA	NA	NA	NA											
HVAC	NA	NA	NA	NA	NA	NA											
PLUMBING	NA	NA	NA	NA	NA	NA											
ELECTRICAL	NA	NA	NA	NA	NA	NA											
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA	NA											
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	NA	NA	NA	NA	NA											
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA	NA											
	YR REP	**YR REP**	**YR REP**	**YR REP**	**YR REP**	**YR REP**											
	REQ	**REQ**	**REQ**	**REQ**	**REQ**	**REQ**											
INPUT ADDITIONAL ITEMS HERE:																	
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	0	0	0	0	0	0											
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,532,166	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425,272	$0	$0	$0	$0	$0	$0	$0
HVAC	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$3,776,969	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,760,210	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$199,589	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	**$1,924,116**	**$0**	**$3,776,969**	**$0**	**$199,589**	**$0**	**$0**	**$0**	**$0**	**$6,603,822**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: STATUS QUO

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)				2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
ANNUAL ELECTRICITY CONSUMPTION (Kwh)				331,127
COST PER Kwh OF ELECTRICITY				$ 0.05110
TOTAL ANNUAL ELECTRICITY COST		YEAR $s	FY05	$ 16,920.61
DRI USER PRICE INDICES	BASE YEAR		FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 17,276.00

WATER

NUMBER OF SQUARE FEET				131,410.00
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0002
TOTAL ANNUAL WATER USE (KGAL)				26.28
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 55.93
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 59.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET				131,410
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0018
TOTAL ANNUAL WATER USE (KGAL)				236.54
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 503.35
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 535.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
COST PER SQUARE FOOT				0.1891
TOTAL ANNUAL STEAM COST		YEAR $s	FY05	$ 24,848.44
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
ANNUAL STEAM COST	FY08 CONSTANT $			$ 26,435.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: STATUS QUO

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$ 17,276.00
WATER		$ 59.00
SEWAGE TREATMENT		$ 535.00
STEAM		$ 26,435.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$ 44,305.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.
POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: RENOVATION

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT				0.58
NUMBER OF SQUARE FEET OF BUILDING SPACE				131,410
TOTAL ANNUAL MAINTENANCE COST	YEAR $s	FY05	$	76,217.80
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $		$	81,083.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 2011

	FROM:	TO:			
BUILDING AGE MULTIPLIER DURING YEARS:	2011	2021	1.00	$	81,083.00
BUILDING AGE MULTIPLIER DURING YEARS:	2021	2031	1.40	$	113,516.00
BUILDING AGE MULTIPLIER DURING YEARS:	2031	2041	1.90	$	154,058.00
BUILDING AGE MULTIPLIER DURING YEARS:	2041	2051	2.10	$	170,274.00
BUILDING AGE MULTIPLIER DURING YEARS:	2051	2061	2.10	$	170,274.00
BUILDING AGE MULTIPLIER DURING YEARS:	2061	50+	1.65	$	133,787.00

DATA SOURCE:

Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT			$ 10.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,412,657.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,532,166.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT			$6.75
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$887,017.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$962,058.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

CEILING FINISHES

M&R COST PER SQUARE FOOT				$3.51
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$461,249.10
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$500,270.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT				$13.50
NUMBER OF SQUARE FEET SPACE				131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,774,035.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,924,116.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT				$9.40
NUMBER OF SQUARE FEET SPACE				131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$1,235,254.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$1,339,755.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,482,365.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,776,969.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			131,410.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$755,607.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$819,531.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2041	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,622,913.50
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,760,210.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHUAL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE, REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: RENOVATION

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE FOOT				$24.00
NUMBER OF SQUARE FEET SPACE				131,410
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04		$3,153,840.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $			$3,420,651.00
YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT			2011	
LIFE EXPECTANCY:	15			
YEARS M&R WOULD BE REQUIRED:				

2026	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL REPAIR, TEST AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: RENOVATION

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		PROGRAM YEAR		2008								
ANALYSIS PERIOD (YEARS)	28											
ECONOMIC LIFE OF FACILITY - 55 YEARS	STOCK NUMBER	EST	OSD RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR LAST	YR REP	YR REP	YR REP	YR REP
ITEM	PART NUMBER	COST	INFL INDEX	PROG YR $		PROG YR $	(YEARS)	REPLACED	REQ	REQ	REQ	REQ
ROOFING	NA	$1,412,658	0.922	$1,532,166	1	$1,532,166	20	2011	2031	NA	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	10	2011	2021	2031	NA	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$887,018	0.922	$962,058	1	$962,058	10	2011	2021	2031	NA	NA
CEILING FINISHES	NA	$461,249	0.922	$425,272	1	$425,272	10	2011	2021	2031	NA	NA
HVAC	NA	$1,774,035	0.922	$1,924,116	1	$1,924,116	20	2011	2031	NA	NA	NA
PLUMBING	NA	$1,235,254	0.922	$1,339,755	1	$1,339,755	30	2011	2041	NA	NA	NA
ELECTRICAL	NA	$3,776,969	0.922	$3,776,969	1	$3,776,969	20	2011	2031	NA	NA	NA
FIRE PROTECTION AND DETECTION	NA	$755,608	0.922	$819,531	1	$819,531	30	2011	2041	NA	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,622,914	0.922	$1,760,210	1	$1,760,210	20	2011	2031	NA	NA	NA
CONCRETE/ASPHALT PAVING	NA	$3,153,840	0.922	$3,420,651	1	$3,420,651	15	2011	2026	NA	NA	NA
		EST	USAF RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR	YR REP	YR REP	YR REP	YR REP
		COST	INFL FACTOR	PROG YR $		PROG YR $	(YEARS)	PURCHASED	REQ	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:												
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

CONSOLIDATED FUEL REPAIR, TEST AND OVERHAUL FACILITY
WORKSHEET 2A
TOTAL PERIODIC MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: RENOVATION

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS																
ANALYSIS PERIOD (YEARS)																
ECONOMIC LIFE OF FACILITY - 55 YEARS	YR REP	YR REP	YR REP	YR REP	YR REP											
ITEM	REQ	REQ	REQ	REQ	REQ											
ROOFING	NA	NA	NA	NA	NA											
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA											
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA											
CEILING FINISHES	NA	NA	NA	NA	NA											
HVAC	NA	NA	NA	NA	NA											
PLUMBING	NA	NA	NA	NA	NA											
ELECTRICAL	NA	NA	NA	NA	NA											
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA											
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	NA	NA	NA	NA											
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA											
	YR REP	YR REP	YR REP	YR REP	YR REP											
	REQ	REQ	REQ	REQ	REQ											
INPUT ADDITIONAL ITEMS HERE:																
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,532,166	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$1,924,116	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$962,058	$0	$0	$0	$0	$0	$0	$0	$0	$0	$962,058	$0	$0	$0	$0
CEILING FINISHES	$0	$425,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$425.272	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,924,116	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,776,969	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,760,210	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$3,420,651	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$3,311,446	$0	$0	$0	$0	$3,420,651	$0	$0	$0	$0	$12,304,907	$0	$0	$0	$0
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: RENOVATION

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)			2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
ANNUAL ELECTRICITY CONSUMPTION (Kwh)			331,127
COST PER Kwh OF ELECTRICITY			$ 0.05110
TOTAL ANNUAL ELECTRICITY COST	YEAR $s	FY05	$ 16,920.61
DRI USER PRICE INDICES	BASE YEAR	FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $		$ 17,276.00
ESTIMATED ENERGY SAVINGS 25%			$ 4,319.00
TOTAL ANNUAL ELECTRICITY COST	FY08 CONSTANT $		$ 12,957.00

WATER

NUMBER OF SQUARE FEET			131,410.00
CONSUMPTION PER SQUARE FOOT (KGAL)			0.0002
TOTAL ANNUAL WATER USE (KGAL)			26.28
COST PER KGAL OF WATER			$ 2.1280
TOTAL ANNUAL WATER COST	YEAR $s	FY05	$ 55.93
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $		$ 59.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET			131,410
CONSUMPTION PER SQUARE FOOT (KGAL)			0.0018
TOTAL ANNUAL WATER USE (KGAL)			236.54
COST PER KGAL OF WATER			$ 2.1280
TOTAL ANNUAL WATER COST	YEAR $s	FY05	$ 503.35
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $		$ 535.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE			131,410
COST PER SQUARE FOOT			0.1891
TOTAL ANNUAL STEAM COST	YEAR $s	FY05	$ 24,848.44
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.940
ANNUAL STEAM COST	FY08 CONSTANT $		$ 26,435.00
ESTIMATED ENERGY SAVINGS 25%			$ 6,609.00
TOTAL ANNUAL STEAM COST	FY08 CONSTANT $		$ 19,826.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: RENOVATION

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$	12,957.00
WATER		$	59.00
SEWAGE TREATMENT		$	535.00
STEAM		$	26,435.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$	39,986.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.
POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL
WORKSHEET 1
ANNUAL MAINTENANCE COSTS
ALTERNATIVE: NEW CONSTRUCTION

ANNUAL MAINTENANCE:

ANNUAL MAINTENANCE COST PER SQUARE FOOT				0.58
NUMBER OF SQUARE FEET OF BUILDING SPACE				140,000
TOTAL ANNUAL MAINTENANCE COST	YEAR $s	FY05	$	81,200.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08		0.940
TOTAL ANNUAL MAINTENANCE COST	FY08 CONSTANT $		$	86,383.00

ESCALATION FACTOR (BUILDING AGE MULTIPLIER)

YEAR OF BENEFICIAL OCCUPANCY OF FACILITY: 2011

	FROM:	TO:		
BUILDING AGE MULTIPLIER DURING YEARS:	2011	2021	1.00	$ 86,383.00
BUILDING AGE MULTIPLIER DURING YEARS:	2021	2031	1.40	$ 120,936.00
BUILDING AGE MULTIPLIER DURING YEARS:	2031	2041	1.90	$ 164,128.00
BUILDING AGE MULTIPLIER DURING YEARS:	2041	2051	2.10	$ 181,404.00
BUILDING AGE MULTIPLIER DURING YEARS:	2051	2061	2.10	$ 181,404.00
BUILDING AGE MULTIPLIER DURING YEARS:	2061	50+	1.65	$ 142,532.00

DATA SOURCE:

Annual Maintenance Cost per Square Foot provided by Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

ANALYSIS PERIOD (YEARS) 28

ROOFING

M&R COST PER SQUARE FOOT			$ 10.75
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,505,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,632,321.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,890,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$2,049,892.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING

M&R COST PER SQUARE FOOT			$6.75
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$945,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,024,946.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

CEILING FINISHES

M&R COST PER SQUARE FOOT			$3.51
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$491,400.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$532,972.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 10
YEARS M&R WOULD BE REQUIRED:

2021	2031	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

HVAC

M&R COST PER SQUARE FOOT			$13.50
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,890,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$2,049,892.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

PLUMBING

M&R COST PER SQUARE FOOT			$9.40
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,316,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,427,332.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

ELECTRICAL

M&R COST PER SQUARE FOOT			$26.50
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,710,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$4,023,861.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 20
YEARS M&R WOULD BE REQUIRED:

2031	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

FIRE PROTECTION AND DETECTION

M&R COST PER SQUARE FOOT			$5.75
NUMBER OF SQUARE FEET SPACE			140,000.00
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$805,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$873,102.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY: 30
YEARS M&R WOULD BE REQUIRED:

2041	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE

M&R COST PER SQUARE FOOT			$12.35
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$1,729,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$1,875,271.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011
LIFE EXPECTANCY:
YEARS M&R WOULD BE REQUIRED:

2011	2011	2011	2011	2011	2011	2011	2011	2011

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 2
PERIODIC MAINTENANCE,
REPAIR AND REPLACEMENT COSTS
ALTERNATIVE: NEW CONSTRUCTION

CONCRETE/ASPHALT PAVING

M&R COST PER SQUARE FOOT			$24.00
NUMBER OF SQUARE FEET SPACE			140,000
TOTAL PERIODIC MAINTENANCE COST	YEAR $s	FY04	$3,360,000.00
OSD RAW INFLATION INDICES	BASE YEAR	FY08	0.922
TOTAL PERIODIC M&R COST	FY08 CONSTANT $		$3,644,252.00

YEAR OF BENEFICIAL OCCUPANCY OR LAST REPLACEMENT 2011

LIFE EXPECTANCY: 15

YEARS M&R WOULD BE REQUIRED:

2026	NA	NA	NA	NA	NA	NA	NA	NA

DATA SOURCE: R.S. Means Facilities Construction Cost Data, 19th Annual Edition, 2004
POC: Harry Dell, 72 ABW/CEC, DSN 884-5238

WORKSHEET 2A
TOTAL [illegible]ODIC
CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: NEW CONSTRUCTIVE

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS		PROGRAM YEAR		2008								
ANALYSIS PERIOD (YEARS)	28											
ECONOMIC LIFE OF FACILITY - 55 YEARS	STOCK NUMBER	EST	OSD RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR LAST	YR REP	YR REP	YR REP	YR REP
ITEM	PART NUMBER	COST	INFL INDEX	PROG YR $		PROG YR $	(YEARS)	REPLACED	REQ	REQ	REQ	REQ
ROOFING	NA	$1,505,000	0.922	$1,632,321	1	$1,632,321	20	2011	2031	NA	NA	NA
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	$1,890,000	0.922	$2,049,892	1	$2,049,892	10	2011	2021	2031	NA	NA
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	$945,000	0.922	$1,024,946	1	$1,024,946	10	2011	2021	2031	NA	NA
CEILING FINISHES	NA	$491,400	0.922	$453,071	1	$453,071	10	2011	2021	2031	NA	NA
HVAC	NA	$1,890,000	0.922	$2,049,892	1	$2,049,892	20	2011	2031	NA	NA	NA
PLUMBING	NA	$1,316,000	0.922	$1,427,332	1	$1,427,332	30	2011	2041	NA	NA	NA
ELECTRICAL	NA	$4,023,861	0.922	$4,023,861	1	$4,023,861	20	2011	2031	NA	NA	NA
FIRE PROTECTION AND DETECTION	NA	$805,000	0.922	$873,102	1	$873,102	30	2011	2041	NA	NA	NA
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	NA	$1,729,000	0.922	$1,875,271	1	$1,875,271	0	2011	2011	2011	2011	2011
CONCRETE/ASPHALT PAVING	NA	$3,360,000	0.922	$3,644,252	1	$3,644,252	15	2011	2026	NA	NA	NA
		EST	USAF RAW	COST	# UNITS	EST TOT REP	USEFUL LIFE	YEAR	YR REP	YR REP	YR REP	YR REP
		COST	INFL FACTOR	PROG YR $		PROG YR $	(YEARS)	PURCHASED	REQ	REQ	REQ	REQ
INPUT ADDITIONAL ITEMS HERE:												
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
		$0		$0	0	$0	0	0	0	0	0	0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEILING FINISHES	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$1,875,271	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$0	$0	$1,875,271	$0	$0	$0	$0	$0	$0	$0	$0
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

WORKSHEET 2A
TOTAL [illegible]ODIC
CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
MAINTENANCE, REPAIR AND REPLACMENT COSTS BY YEAR
ALTERNATIVE: NEW CONSTRUCTIVE

PERIODIC MAINTENANCE, REPAIR, AND REPLACEMENT COSTS																
ANALYSIS PERIOD (YEARS)																
ECONOMIC LIFE OF FACILITY - 55 YEARS	YR REP	YR REP	YR REP	YR REP	YR REP											
ITEM	REQ	REQ	REQ	REQ	REQ											
ROOFING	NA	NA	NA	NA	NA											
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	NA	NA	NA	NA	NA											
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	NA	NA	NA	NA	NA											
CEILING FINISHES	NA	NA	NA	NA	NA											
HVAC	NA	NA	NA	NA	NA											
PLUMBING	NA	NA	NA	NA	NA											
ELECTRICAL	NA	NA	NA	NA	NA											
FIRE PROTECTION AND DETECTION	NA	NA	NA	NA	NA											
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	2011	2011	2011	2011	2011											
CONCRETE/ASPHALT PAVING	NA	NA	NA	NA	NA											
	YR REP	YR REP	YR REP	YR REP	YR REP											
	REQ	REQ	REQ	REQ	REQ											
INPUT ADDITIONAL ITEMS HERE:																
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	0	0	0	0	0											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ROOFING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,632,321	$0	$0	$0	$0
INTERIOR WALLS AND DOORS, WINDOWS, EXTERIOR CLOSURES	$0	$2,049,892	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,049,892	$0	$0	$0	$0
WALL AND FLOOR FINISHES, PAINT, WALL COVERINGS, CARPETING	$0	$1,024,946	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,024,946	$0	$0	$0	$0
CEILING FINISHES	$0	$453,071	$0	$0	$0	$0	$0	$0	$0	$0	$0	$453,071	$0	$0	$0	$0
HVAC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,049,892	$0	$0	$0	$0
PLUMBING	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ELECTRICAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,023,861	$0	$0	$0	$0
FIRE SAFETY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STRUCTURAL WALLS, EIFS AND ROOF STRUCTURE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CONCRETE/ASPHALT PAVING	$0	$0	$0	$0	$0	$0	$3,644,252	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL BY YEAR	$0	$3,527,909	$0	$0	$0	$0	$3,644,252	$0	$0	$0	$0	$11,233,983	$0	$0	$0	$0
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: NEW CONSTRUCTION

ELECTRICITY

CONSUMPTION PER SQUARE FOOT (Kwh)				2.519804
NUMBER OF SQUARE FEET OF BUILDING SPACE				140,000
ANNUAL ELECTRICITY CONSUMPTION (Kwh)				352,773
COST PER Kwh OF ELECTRICITY				$ 0.05110
TOTAL ANNUAL ELECTRICITY COST		YEAR $s	FY05	$ 18,026.68
DRI USER PRICE INDICES	BASE YEAR		FY08	1.0210
ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 18,405.00
ESTIMATED ENERGY SAVINGS 35%				$ 6,442.00
TOTAL ANNUAL ELECTRICITY COST	FY08 CONSTANT $			$ 11,963.00

WATER

NUMBER OF SQUARE FEET				140,000.00
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0002
TOTAL ANNUAL WATER USE (KGAL)				28.00
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 59.58
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 63.00

SEWAGE TREATMENT

NUMBER OF SQUARE FEET				140,000
CONSUMPTION PER SQUARE FOOT (KGAL)				0.0018
TOTAL ANNUAL WATER USE (KGAL)				252.00
COST PER KGAL OF WATER				$ 2.1280
TOTAL ANNUAL WATER COST		YEAR $s	FY05	$ 536.26
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.940
TOTAL ANNUAL WATER COST	FY08 CONSTANT $			$ 570.00

STEAM

NUMBER OF SQUARE FEET OF BUILDING SPACE				140,000
COST PER SQUARE FOOT				0.1891
TOTAL ANNUAL STEAM COST		YEAR $s	FY05	$ 26,472.73
OSD RAW INFLATION INDICES	BASE YEAR		FY08	0.938
ANNUAL STEAM COST	FY08 CONSTANT $			$ 28,223.00
ESTIMATED ENERGY SAVINGS 35%				$ 9,878.00
TOTAL ANNUAL STEAM COST	FY08 CONSTANT $			$ 18,345.00

CONSOLIDATED FUEL TEST, REPAIR AND OVERHAUL FACILITY
WORKSHEET 3
UTILITY COSTS
ALTERNATIVE: NEW CONSTRUCTION

TOTAL ANNUAL UTILITY COST

ELECTRICITY		$ 11,963.00
WATER		$ 63.00
SEWAGE TREATMENT		$ 570.00
STEAM		$ 28,223.00
TOTAL ANNUAL UTILITY COST	FY08 CONSTANT $	$ 40,819.00

DATA SOURCE: COST ESTIMATES BASED ON TINKER AFB HISTORICAL COST FOR INDUSTRIAL FACILITIES.
POC: JOHN HURD, 72 CES/CECR, VOICE DSN 884-5238, FAX DSN 884-5538

HISTORICAL STATUS QUO FACILITY COSTS

			Inflation Index	FY08 Constant $
ROOF/REPLACEMNT- AIR HDLNG UNITS & COOLING TWRS/CHILLERS-3108-A2	FQ203073100100	$ 2,431,069.00		
REPLACE COOLING TOWER/CHILLER - B3108	FQ203080420100	$ 1,257,500.00		
PAINT EXTERIOR - B3108	F555DE91553000	$ 44,976.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108 & AMEND1	F7TIPR8026-0100	$ 32,000.00		
FY99 TOTAL	**FY99 TOTAL**	**$ 3,765,545.00**	**0.860**	**$ 4,377,715**
REPLACE ELEC SYS,FIRE ALARM, EMER&EXIT LGHTS - PHASE 1 -N. ANNX-3108	FD2030-00-57360	$ 3,200,000.00		
INSTALL/REPLACE SPKLERS,STRUCTURAL FIXES,PAINT, PHASE 2 -N. ANNX-3108	FD2030-00-57361	$ 1,200,000.00		
REPLACE BUSWAYS/SWITCHES & REPAIR SAFETY SYSTEMS - B3108 - AMEND 1	FD2030-00-57336	$ 200,000.00		
EMERGENCY REPAIR AIR HANDLERS, SOUTH END - B3108 .	F555DE01091000	$ 165,000.00		
REPLACE BUSWAYS/SWITCHES & REPAIR SAFETY SYSTEMS - B3108	FD2030-00-57336	$ 110,000.00		
REPAIR ROOF & REPLACE AIR HANDLING UNITS PHASE 2 - B3108		$ 108,057.00		
A & E SERVICES FOR ROOF STRUCTURE ANALYSIS - B3108	F555DE93641000	$ 37,315.00		
STUDY TO REPLACE BUSWAY/SWITCHES - B3108	FQ203092521000	$ 35,000.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR9137-0100	$ 25,000.00		
REPLACE BUSWAY/SWITCHES(CIRCUIT BREAKERS) - B3108	F555DE92522000	$ 22,000.00		
REMOVE EXISTING AND INSTALL NEW CARPET TILES-2ND FLOOR ADMIN-B3108	HY070059	$ 3,000.00		
REPLACE BUSWAY/SWITCHES(CIRCUIT BREAKERS) S. ANNX - B3108 - AMEND 1	F555DE92522000	$ 815.00		
FY00 TOTAL	**FY00 TOTAL**	**$ 5,106,187.00**	**0.872**	**$ 5,854,346**
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR0187-0100	$ 28,500.00		
FY01 TOTAL	**FY01 TOTAL**	**$ 28,500.00**	**0.888**	**$ 32,098**
STRUCTUAL REPAIR		$ 256,000.00		
CLEAN FLOOR TRENCHES AND FLOOR		$ 140,000.00		
LIGHTNING AND GROUNDING PROTECTION UPGRADE		$ 230,000.00		
REPLACE EXTERIOR DOORS		$ 250,000.00		
MAINT C02 FIRE PROTECTION SYS - B3902 & B3108	F7TIPR1130-0300	$ 31,350.00		
REPLACEMENT OF DOCK LEVELER (EQUIP ELEVATOR)-B3108		$ 25,000.00		
REPLACE HVAC UNIT, SOUTH SECTION - B3108		$ 900,000.00		
REPLACE LIGHT FIXTURES, SOUTH SECTION - B3108		$ 150,000.00		
PAINT INTERIOR - B3108		$ 70,000.00		
FY02 TOTAL	**FY02 TOTAL**	**$ 2,052,350.00**	**0.895**	**$ 2,293,110**
RENOVATE 2ND FLOOR ADMIN -B3108		$ 380,120.00		
INTERIOR RENOVATION-B3108		$ 300,000.00		
ALLEYWAY PAVEMENT REPAIR-BETWEEN B3001/B3108		$ 300,000.00		
MAINT C02 FIRE PROTECTION SYS PHASE 2 - B3902 & B3108		$ 70,000.00		
FY03 TOTAL	**FY03 TOTAL**	**$ 1,050,120.00**	**0.904**	**$ 1,161,692**
Interior Renovation		$ 170,000.00		
Expand Production Admin Area		$ 20,000.00		
Replace PMEL Floor		$ 29,000.00		
FY04 TOTAL	**FY04 TOTAL**	**$ 219,000.00**	**0.922**	**$ 237,518**

Exterior Doors Replacement		$ 180,000.00		
Repair/Replace Roof		$ 300,000.00		
Repair Air Handling Unit		$ 200,000.00		
Install Protection Rail for Fire Escape		$ 5,000.00		
Install Exhaust Fan (Electrical Room)		$ 3,000.00		
Interior Painting		$ 300,000.00		
FY05 TOTAL	**FY05 TOTAL**	**$ 988,000.00**	**0.940**	**$ 1,050,530**
Motor Control Center		$ 70,000.00		
Replace Lightning Protection		$ 175,000.00		
Replace Fuel Leak Detection		$ 300,000.00		
	FY06 TOTAL	**$ 545,000.00**	**0.959**	**$ 568,130**
				$ 15,575,139

TRANSPORTATION COST CALCULATIONS

Building 3902									
No. People	Series/Grade	Estimated Time	Total Estimated Time (Hours per Week)	Total Estimated Time (Hours per Year)	Hourly Rate Step 4	Acceleration Factor	Accelerated Hourly Rate	Inflation Index	Estimated Annual Cost FY05$
1	WG6904-6	3x/day (30 Min)	7.5	390	18.09	1.545	27.95	0.93094	10148
1	WG2616-6	3x/day (30 Min)	7.5	390	18.09	1.545	27.95	0.93094	10148
1	WG8255-9	10x/week (15 min)	2.5	130	21.24	1.545	32.82	0.93094	3972
1	WG8255-10	3x/week (15 min)	0.75	39	22.25	1.545	34.38	0.93094	1248
1	WG8255-11	3x/week (15 min)	0.75	39	23.23	1.545	35.89	0.93094	1303
Swing Shift									
1	WS8255-10	2x/night (15 min)	2.5	130	23.92	1.545	36.96	0.93094	4473
Building 3108 - Shop Rotates Mechanics									
No. People	Series/Grade	Estimated Time	Total Estimated Time (Hours per Week)	Total Estimated Time (Hours per Year)	Hourly Rate	Acceleration Factor	Accelerated Hourly Rate	Inflation Index	Estimated Annual Cost FY05$
1	WG8255-9	3x/day (15 Min)	3.75	195	21.24	1.545	32.82	0.93094	5958
1	WG3359-9	2x/week (15 Min)	0.5	26	21.24	1.545	32.82	0.93094	794
1	WG2854-9	2x/week (15 Min)	0.5	26	21.24	1.545	32.82	0.93094	794
3	WG2854-9	3x/week (15 Min)	2.25	117	21.24	1.545	32.82	0.93094	3575
Estimated Annual Transportation Cost									**$ 42,413**

Lean Transformation Savings

Data in FY04 $	Direct Labor	Inflation	FY08 $s
Status Quo Cost	$ 14,252,635	0.898	15,871,531
New Construction 16.5% Reduction	$ 11,900,950	0.898	13,252,728
	Direct Materials	Inflation	FY08 $s
Status Quo Cost	$ 53,568,792	0.922	58,100,642
New Construction 15% Reduction	$ 45,533,473	0.922	49,385,546
	Overhead	Inflation	FY08 $s
Status Quo Cost	$ 25,123,740	0.922	27,249,176
New Construction 11.5% Reduction	$ 22,234,510	0.922	24,115,521

			Hazardous Fuel Component Study				
				B3108 March 1991			
Items not repaired in B3108 as recommended by the U.S. Army Corps of Engineers							
Over and Above Periodic Maintenance							
Site Conditions:							
	Paving					$70,000.00	
	Steam Utilities					$114,000.00	
	Remove Asbestos (Outside)					$98,322.00	
	Install 12" CMU w/4" face brick					$498,858.00	
	Brick Ledge					$12,401.00	
	Doors and Hardware					$30,000.00	
	Industrial O/H Doors					$35,200.00	
	Sub-Total					**$858,781.00**	
Architectural:							
	New Roof A,B, and C	(Est for Areas D,E, and F)				$238,000.00	
	Handicap Access Issues						
		Second Floor Removal				$36,348.00	
		Construct Support Area				$220,000.00	
		Landings and Ramps				$168,530.00	
		Stairs				$23,520.00	
	Sub-Total	**Sub-Total**				**$686,398.00**	
Mechanical Systems:							
	HVAC						
	Chiller						
	Hot Water System to Replace Steam						
	New Compressed Air and Piping Systems						
	New Plumbing						
	Sub-Total					**$2,178,600.00**	
	TOTAL					**$3,723,779.00**	
	Indirect Costs			40%		$5,213,290.60	
	Contingencies			10%		$5,734,619.66	
	Grand Total in 1991 Dollars					**$5,734,619.66**	
	Raw Inflation Factor					0.742	
	Grand Total in 2008 Dollars					**$7,728,598**	

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APPENDIX C

United States Army Corps of Engineers Memorandum

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

CESWT-RO (1145) 21 September 2007

MEMORANDUM FOR 72 ABW/CEV: Mr. John Krupovage
7701 Arnold Street, Suite 204
Tinker AFB, OK 73145-9100

SUBJECT: Section 404 Review for Tinker Air Force Base, Jurisdictional Determination for FCF Site, Identification Number 2007-637

1. This is in regard to the Tinker Air Force Base, Environmental Management Division, request for a jurisdictional determination for the FCF site located near the Consolidated Fuels Operation Building. This project is located on the base in the Northwest ¼ of Section 24, Township 11 North, Range 2 West, Oklahoma City, Oklahoma County, Oklahoma.

2. The Regulatory Office has completed an evaluation pursuant to Section 404 of the Clean Water Act (CWA). The referenced wetland is not a part of the unnamed tributary of Soldier Creek, which is a jurisdictional water of the United States (WOUS), subject to Section 404 CWA.

3. The referenced FCF site is not a jurisdiction wetland [33 CFR 328.3 (b)]. Placement of dredged or fill material within this wetland will not require Department of the Army authorization pursuant to Section 404 CWA.

4. If you have any questions concerning this matter, please call Mr. Michael Ware at 918-669-7619.

for Michael Ware

DAVID A. MANNING
Chief, Regulatory Office

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APPENDIX D

Title V Permit Email between Oklahoma Department of Environmental Quality and Tinker AFB

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To: Martin, Marcie
Subject: RE: Consolidated Fuels Facility, Environmental Assessment, Address of Comments and Status of Report

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From: Kienlen, Richard [mailto:Richard.Kienlen@deq.state.ok.us]
Sent: Monday, May 21, 2007 10:00 AM
To: Wheeler, Teresa H Civ 72 ABW/CEVOC
Subject: Building 3907 Feasibility Study

Teresa,

After reviewing the feasibility study presented to Air Quality last week, it is agreed that no control of the Stoddard solvent emissions is viable or necessary at this time, based on the following:

1. Stoddard solvent is a very low vapor pressure VOC, resulting in lower emissions than the fuels (JP-5/JP-8) used in the equipment in actual operation.
2. There are no NSPS or MACT subparts covering Stoddard solvent or the test stands that use it.
3. Due to the high air flow rate and low VOC concentration, the cost per ton of control is considered excessive for the benefit derived.
4. Three years ago a BACT determination showed no controls necessary for twice the amount of emissions as are contemplated for the new Building 3907. In the subsequent three years, no new control options have been introduced since the previous BACT determination was done.
5. Based on the RBLC, there are no in-use, full scale operations controlling this type of operation at this time. EPA's own guidance (October 1990) requires the control be demonstrated and in full scale use before its implementation can be required.

If you have any other questions, please call.

Richard

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